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JANUARY,
1935
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Next Month

● John Seitz will talk about Rhythm with Light. Mr. Seitz is considered one of the outstanding cinematographers of the industry. This will be the second in a series of articles on the artistic side of cinematography as practiced by the leading cinematographers in Hollywood. This month Victor Milner talked on Mood in Lighting. Mr. Milner gives a glimpse of what the ace cinematographer aims at when shooting the present-day picture.

● There will be other articles in our next issue. The Cinematographer with Father Hubbard on his latest expedition will tell you of his experiences.

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THE AMERICAN SOCIETY OF CINEMATOGRAPHERS was founded in 1918 for the purpose of bringing into closer confederation and cooperation all those leaders in the cinematographic art and science whose aim is and ever will be to strive for pre-eminence in artistic perfection and technical mastery of this art and science. Its purpose is to further the artistic and scientific advancement of the cinema and its allied crafts through unceasing research and experimentation as well as through bringing the artists and the scientists of cinematography into more intimate fellowship. To this end its membership is composed of the outstanding cinematographers of the world with Associate and Honorary memberships bestowed upon those who, though not active cinematographers, are engaged none the less in kindred pursuits, and who have, by their achievements, contributed outstandingly to the progress of cinematography as an Art or as a Science. To further these lofty aims and to fittingly chronicle the progress of cinematography, the Society's publication, The American Cinematographer, is dedicated.

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Creating Moods With Light

Rewritten for May '54 A.C.

by
Victor Milner, A.S.C.

LIGHT is the Cinematographer's most versatile tool. With it he can not only make or break his composition, and display his players to advantage or otherwise, but he can attune the audience-mind to any mood, and key the response to any emotional pitch. Intelligent lighting can prepare the audience for any desired dramatic tempo, and create a subconscious, emotional receptiveness that greatly enhances the dramatic value of the production.

It is not enough that a scene be an intrinsically beautiful bit of photography: it is essentially a vehicle for dramatic expression, and every phase of the photography—especially the lighting—should exist for the specific purpose of telling the scene's story. The Cinematographer who strives solely for pictorial effect, and the man who rigidly follows a fixed scheme of lighting for every production both hamper themselves tremendously. Lighting technique should be flexible, changing (even within a sequence) to harmonize with the mood and tempo of the action.

The Cinematographer should train himself to think directly in terms of lighting. He should be able to read a script and from the bare printed outline of a scene, visualize it not merely in terms of action, or even of camera-angles and moves, but in terms of lighting. It is easy enough to read a heavy, dramatic scene which must necessarily be sombre and slow-paced, and understand that it must be photographed in a low key; or to glance over a swift-paced comedy scene, and see that it will require high-key lighting; but the really important thing is to be able to form such a clear mental picture of the light-treatment of a scene that the lighting itself expresses the scene's mood, tempo and character as clearly as do dialog and action.

Picture, for example, this situation: in a bed in a small room, an old man lies dying; beside him sits his wife, who has shared his joys and sorrows for perhaps fifty years, tensely watching, waiting for the crisis. Different individuals, I suppose, would visualize this in different ways; to my mind, it conjures up at once a mental image of dramatic light-effects. I can see the scene lit in a very low key, with only an extremely repressed scale of gradations. The figure in the bed is limned in grayish light, while the motionless figure of the wife is half hidden in shadow—ominous, formless shadows, relieved only by the subdued illumination on the bed-ridden figure. The lighting alone, unaided by dialog or action, could tell the story perfectly. An atmosphere of such dramatic power could be built up by skillfull lighting that the audience would inevitably experience the tense, wordless agony of the situation, and sense the breathless emotion of an actual deathbed.

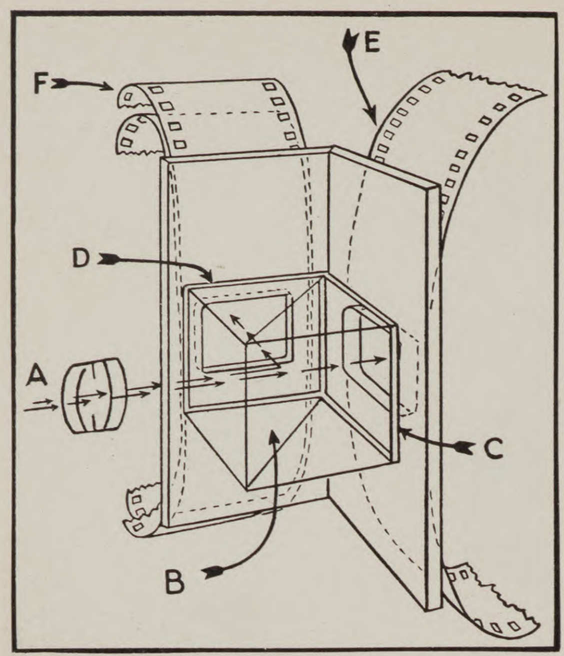
Before the advent of sound and dialog, 90% of the responsibility of securing the desired emotional effect in such a scene lay in the hands of the Cinematographer. Today, even with the great advantages of speech, vocal inflection, music and sound-effects, it still rests with the Cinematographer whether the scene shall be merely a well-acted scene, or a gripping emotional experience. The true test of Cinematography is the emotional and dramatic effect it would convey if viewed without the assistance of the sound-track.

To a very limited extent, changes in the mood and tempo of lighting may be brought about by increasing or decreasing the actual amount of light used; but the most essential factors in producing such effects should be judicious manipulation of the lighting-balance, and of the diffusion used on both camera and lights. My personal preference is to minimize the diffusion introduced photographically, and to substitute controlled diffusion in illumination. Photographic diffusion is, at best, an unnatural and unsatisfactory thing, and often the difference in diffusion between a longshot and its correlative close-up becomes physically as well as esthetically a jarring note. The best practice, therefore, is to maintain a fairly constant standard of photographic diffusion throughout, and to manipulate the diffusion in lighting to produce the effects desired.

In the same way, altering the light-diffusion and the beam-concentration is often preferable to substituting larger, smaller or optically different units as the camera-angle changes. A condenser-type spotlight, for example, will give a more intense beam than the average mirror-lamp of the same wattage, and the two are sometimes used interchangeably for certain effects. I have found, however, that the light from the condenser lamp is much whiter, and can be cruelly deceptive when attempting to balance it with other, yellower illuminants, so it is better to use the same unit, altering the diffusing media and

Continued on Page 14

Explanation



Detail of Three-Color Technicolor Camera.
A—Path of light through lens and beam-splitter.
B—Beam-splitter (partially reflecting prism).
C—Green filter in Aperture.
D—Magenta filter in Aperture.
E—SuperSensitive film for Green negative.
F—Bipack film for Red (rear) and Blue (front) negatives.

FOR NEARLY forty years it has been acknowledged that natural-color cinematography could not attain widespread commercial success until a really practical three color-component process was developed. During that time, innumerable experiments have been made, and scores of patents granted, upon three-color processes, some of which gave excellent results under laboratory test-conditions. None of them, however, proved successful under the rigorous test of commercial production. None the less, rumors have always been rife that such a process was just around the corner—just short of commercial perfection.

For the past decade, these rumors have been justified, for it has been known that the exponents of Technicolor—already successful as a two-color process—were developing a trichromatic process. No official hint, however, came from the Technicolor laboratories, where everyone was much too busy solving the laboratory problems of processing two-color films in quantity to make any statements about possible three-color developments.

Late in 1932, Technicolor announced that the new three-color process was a fact, and was commercially available. Since then, the process has been used in over a score of Walt Disney's "Silly Symphonies," in musical and travel "shorts," and in special color sequences climaxing such productions as "The Cat and the Fiddle," "The House of Rothschild," and "Kid Millions." The three-reel featurette, "La Cucaracha"—a gem of natural-color photography—bids fair to make the Industry acutely color-conscious, and the same producers are even now bringing "Becky Sharp" to the screen as the first trichrome feature. The process has proven itself in cartoon work, on location, and in the studio: every sign (not the least of which is returning box-office prosperity) points to a considerable use of the process in the coming year's more important productions. What, then, is Three-Color Technicolor?

Essentially, it is exactly what the name implies: a new process of natural-color cinematography which utilizes three, instead of only two, color-components. Other than the name, it has very little in common with the older, two-color Technicolor. The camera-equipment with which it is photographed is new, and far sturdier than previous color-cameras. The results are superior to any previous commercial color-process. Most important of all, with the new process comes a basic change in Technicolor's policy toward cameramen.

At this point, it may be well to clarify the significance of the term "three-color" process. Medical science tells us that the human eye receives its color-impressions through three primary nerve-centers, each of which transmits to the brain one primary color impression. The three colors thus received—red, yellow and blue—are termed the primary colors, and all other color-impressions are made up of varying combinations of these three. (Green, for example, is a simple overlapping of blue and yellow impressions.)

This same principle is the foundation of all forms of natural-color photography and cinematography. Obviously, if we make three black-and-white negatives of a scene, recording on one plate all of the red elements, on another, all of the yellows, and on the third, all of the blues, we shall have duplicated the selective action of the three color-sensory nerve-centers of the eye. If then we make positive transparencies from the three negatives, toning each in its appropriate hue, and view the three superimposed, we shall have duplicated the resynthetizing brain-action, and should arrive at the same result—an image of the scene in its natural colors.

It is by no means easy, however, to apply this principle to photography in a practical way; and applying it to cinematograhy raises innumerable mechanical and technical difficulties—especially if the process is to be used commercially. The three separation-negatives must be exposed at the same time, through a single lens. The color-filters which must be used to produce these separations absorb a great deal of light, necessitating increased exposure — yet the films must be made at the standard sound-speed of 90 feet per minute. The cameras and their optical systems must be of unusual optical and mechanical precision—yet they must be sturdy and simple, as well as being relatively light and portable. The laboratory processes should be simple and dependable. The prints must be such as to run on any projector without special equipment: this necessitates that the prints be "subtractive," that is, that they have a perfect picture, of standard dimensions, in full color. The question of graininess in large-screen projection rules out the screen-plate method, which has been so successful in still photography.

Reducing the number of color-components used from three to two reduces the technical problems proportionately. At the same time, a two-color process is more or less color-blind: it gives a fair suggestion of actual color, but it cannot give natural color, since it omits one-third of the primary color-components. None the less, every pre-

# of the Trichrome Technicolor

by
William Stull, A.S.C.

vious color-cinematography process which has achieved any degree of commercial success has been a two-color process. Nearly all of them have used colors which in some measure have partaken of the missing third: in some instances, red-orange and blue; in others, red and blue-green, or red-orange and blue-green. In any case, the majority of colors have beein rendered with more or less distortion, while others simply could not be reproduced. In addition, the two primaries were generally exaggerated to some extent.

Technicolor's two-color process was probably the most successful of the lot, but it, no less than the rest, suffered from partial color-blindness, and the cameras were noisy and delicate. The two images—red-orange and green—were recorded on a single film, which moved at twice normal speed. A single lens was used, and its image was divided by a beam-splitting prism: the red image being reflected to a position one frame below the normal axis, while the green image was two frames above the usual gate. The film was moved two frames at a time, and consumed double footage required for photographing the same action in black-and-white. Printing was either on double-coated positive stock (by a special optical printer) or by the imbibition process. The latter proved the more economical, though at first the results were not satisfactorily uniform, a difficulty now understood to have been overcome. The cameras were excessively noisy, and were not popular with sound-engineers.

The three-color process is in many ways simpler than the two-color method. Three separate films are used, exposed through a single lens, at standard speed. All three are standard types: those receiving the red and green images are standard SuperSensitive Panchromatic, while the blue is recorded on the familiar red-ortho. All three are hypersensitized in the Technicolor plant.

The optical system is simplicity itself: standard Cooke lenses are used (recalibrated by Technicolor). Behind the lens is a simple beam-splitter, which reflects 2/3 of the light from the lens through an aperture to the left, placed at right angles to the normal position, and passes the remaining 1/3 straight through to a normal aperture. This latter aperture is fitted with a green filter, and a green record is made on regular SuperSensitive film at that point. The second aperture is fitted with a magenta filter (transmitting blue and red light), behind which moves ordinary bipack film. The red-ortho film which forms the front component of the bipack, naturally receives the blue image; its dyed outer surface, in contact with the rear film (SuperSensitive Panchromatic), acts as a red filter, so that this third film receives only the red image. On exterior scenes a light yellow filter is usually placed on the lens, presumably to exclude the ultra-violet and curtail some of the violet, maintaining the proper chromatic balance.

The camera was designed and built by Technicolor, with special Mitchell movements. While it is more silent than many earlier color cameras, the triple-film movement makes it necessary to use the camera heavily blimped for sound work. Naturally, it is considerably larger and heavier than ordinary black-and-white cameras, but not unduly so. It is a decidedly modern design, and definitely built for hard service. The beam-splitting optical system—the weak point of previous Technicolor cameras—has been so simplified that it is not only foolproof, but extremely rugged. It can easily be removed, but the design is such that it can only be replaced in the proper manner, and in exactly the right adjustment. The camera-head is box-form in shape, and somewhat reminiscent of several of the silent (black-and-white) cameras lately introduced. Above it are mounted the special 1,000-foot magazines. These magazines are of triple width, to contain the three films; and, unlike conventional magazines, they are loaded from the right-hand side, with the take-up mechanism on the left. Ingress to the two movements is had through three openings—one at each side and one in front. All three must be used in threading the camera. A conventional sunshade and finder are fitted in the customary manner.

Focusing is primarily by scale, for which the lenses are calibrated with unusual accuracy. It is possible, however, to check the focus on a ground-glass screen through an eyepiece at the side of the camera. However, as this screen receives only a small part of the light from the lens, due to the beam-splitter, the image is generally very dim, and it is best to rely on the lens-calibrations for focusing.

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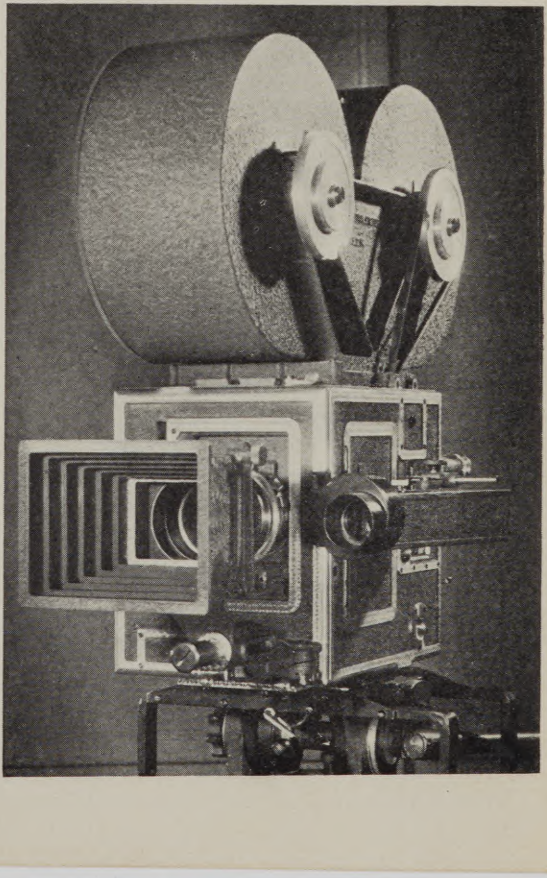

View of a Technicolor Three-Color Camera.

PHOTOGRAPHY of the MONTH

"FATHER BROWN, DETECTIVE" (Paramount)

Theodor Sparkuhl, A.S.C.: Directing Cinematographer
Daily Variety (November 21, 1934): "Theodor Sparkuhl has turned in a fine job with the camera—."
Hollywood Reporter (November 21, 1934): "—well photographed."

"BRIGHT EYES" (Fox)

Arthur Miller, A.S.C.: Directing Cinematographer
Daily Variety (November 22, 1934): "Photography by Arthur Miller is good."
Hollywood Reporter (November 22, 1934): "Arthur Miller's photography passes with a high mark."

"WEST OF THE PECOS" (Radio)

James Van Trees, A.S.C., Russell Metty, A.S.C.: Directing Cinematographers
Hollywood Reporter (November 22, 1934): "Beautiful photography of the great open spaces provides the last requisite touch."
Daily Variety (November 22, 1934): "—exterior photography by Van Trees and Metty is tops."

"BEHOLD MY WIFE" (Paramount)

Leon Shamroy, A.S.C.: Directing Cinematographer
Hollywood Reporter (November 22, 1934): "Shamroy's photography is excellent throughout."

"THE MIGHTY BARNUM"

Peverell Marley, A.S.C.: Directing Cinematographer
Daily Variety (November 22, 1934): "—well photographed."

"STRANGE WIVES" (Universal)

George Robinson, A.S.C.: Directing Cinematographer
Hollywood Reporter (November 24, 1934): "Robinson's photography is very good."
Daily Variety (November 24, 1934): "—plus fine photography—."

"JEALOUSY" (Columbia)

John Stumar, A.S.C.: Directing Cinematographer
Hollywood Reporter (November 24, 1934): "—and the photography by John Stumar helps considerably."

"FORSAKING ALL OTHERS" (M-G-M)

Gregg Toland, A.S.C., George Folsey, A.S.C.: Directing Cinematographers
Hollywood Reporter (November 26, 1934): "—and Gregg Toland's photography adds its particular artistry to the elegant whole."
Daily Variety (November 26, 1934): "Piece is exceptionally well photographed." "Joan Crawford gets from Gregg Toland and George Folsey the best benefit of camera she has had in a long time."

"GRAND OLD GIRL" (RKO)

Lucien Andriot, A.S.C.: Directing Cinematographer
Hollywood Reporter (November 26, 1934): "Photography throughout the picture is okay."

"THE MARINES ARE COMING" (Mascot)

Ernest Miller, A.S.C., William Nobles, A.S.C.: Directing Cinematographers
Hollywood Reporter (November 27, 1934): "Camera work is first class throughout—'.'
Daily Variety (November 27, 1934): "Excellent photography by Ernest Miller and William Nobles.—"

"HERE IS MY HEART" (Paramount)

Karl Struss, A.S.C.: Directing Cinematographer
Hollywood Reporter (November 28, 1934): "Photography and mounting are first rate throughout."
Daily Variety (November 28, 1934): "Some outstanding camera work reflects painstaking effort on the part of Karl Struss."
Motion Picture Daily (November 30, 1934): "Karl Struss' photography embellishes the exquisite backgrounds."

"SWEET ADELINE" (Warner Bros.)

Sol Polito, A.S.C.: Directing Cinematographer
Daily Variety (November 28, 1934): "Sol Polito deserves high praise for handling of the camera."

"THE FIGHTING ROOKIE" (Mayfair)

James Brown, Jr., A.S.C.: Directing Cinematographer
Hollywood Reporter (November 30, 1934): "Good Photography."

"MAN WHO RECLAIMED HIS DEAD" (Universal)

Merritt Gerstad, A.S.C.: Directing Cinematographer
Daily Variety (December 1, 1934): "Photography by Gerstad is excellent—."
Hollywood Reporter (December 1, 1934): "Merritt Gerstad's photography is beautiful throughout, with a few scenes at the beginning of the picture that are standouts of the art."

"HELLDORADO" (Fox)

John Seitz, A.S.C.: Directing Cinematographer
Hollywood Reporter (December 5, 1934): "—and the camera work by John Seitz is very lovely, particularly the scenes shot through cobwebs."

"LOTTERY LOVER" (Fox)

Bert Glennon, A.S.C.: Directing Cinematographer
Hollywood Reporter (December 5, 1934): "Bert Glennon has turned in his usual good photography."

"ENCHANTED APRIL" (Radio)

Edward Cronjager, A.S.C.: Directing Cinematographer
Hollywood Reporter (December 6, 1934): "Photography very good."

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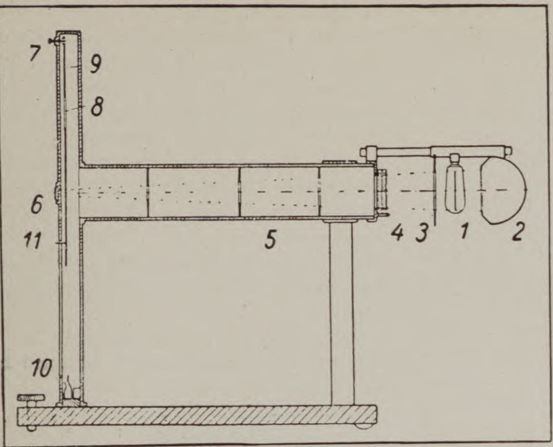

3. Apparatus for making the exposure by the DIN method. The light emerging from the light source (1), behind which is placed a black body (2), passes through diaphragm (3), liquid filter (4), diaphragmed tube (5) to the test strip placed in the dark slide (6) behind the gray wedge. The exposure follows the drawing of the pin (7), whereby the falling shutter (8-9) provided with a slot falls freely and admits light to the plate holder for .05 second. The spring (10) serves as a guide for the shutter, which after exposure is raised again by means of the lever (11).

The Din-Scale

New Measure of Photographic Sensitivity

by

Martin Biltz, Dessau*

THE sensitivity of a photographic emulsion can be characterized in an exact sense only by a great number of exposure steps. In picture photography, however, one desires the sensitivity represented by a single number, where the correct diaphragm setting and exposure time can be chosen from existing exposure meters and exposure tables. In order to accomplish this wish, no efforts were spared during the past century. However, only lately has a practical serviceable method been obtained. In what follows, the sensitometric systems of Scheiner, Hurter and Driffield, Eder-Hecht, used up to the present time for this purpose will be briefly described. Mainly, however, the new system proposd by the Standardizing Committee on Sensitometry of the German Society for Photographic Research, is to be considered.

If it is desired to characterize exactly the sensitivity then the density S produced on a photographic plate after development and fixing must be specified as a function of the intensity of the exposing light (measured in e.g. watts/cm^2), the exposure time, and the wavelength of the exposing light.[2] In order to obtain a single sensitivity number for use in practical exposures, the following simplifications are made. 1. The American viewpoint on this question was recently made public by a report of the research by Davis and Neeland on this point. (Naturwiss. 21, 340, 1933.) 2. $S = \log I_0/I$. I_0 = intensity of the incident light, I the intensity of the transmitted light.

1. In order to eliminate the complication of the variation of sensitivity with light of varying wavelength in the visible spectrum, the sensitivity is considered for a complex spectrum containing many wavelengths. This simplification is permissible providing that the spectral energy distribution of the light source (for determining sensitivity) is the same as that of the light source for the practical exposure.

2. Either the intensity of the incident light or the exposure time is maintained constant and the dependence of density entirely upon one of these two factors is considered.

3. Among the abscissa values of the density curve (exposure time or light intensity) a single value is chosen as characteristic of the sensitivity. In this manner, a number of the dimensions $\frac{\text{intensity} \times \text{time}}{\text{emulsion surface}}$, which may also be expressed in ergs/cm^2, is obtained.

The above so-called simplifications have been accomplished differently by the different sensitometric systems.

Scheiner accomplished the simplification by employing a Benzin flame; Hurter and Driffield employed burning magnesium ribbon. Of all these light sources, none corresponded in spectral energy distribution to that of the sun, which is the source most often used in practical photography. In comparison with the energy distribution in sunlight, the energy distribution of the lamp used by Scheiner and Hurter and Driffield rises especially high toward the red end of the spectrum, so that a comparison of the speeds of orthochromatic and particularly panchromatic emulsions with the speed of unsensitized emulsions tested with these light sources show a much greater difference than they would for a practical exposure to sunlight. Also the light of burning magnesium ribbon differs greatly in its spectral distribution from sunlight.

The simplification was accomplished by Scheiner and by Hurter and Driffield by holding the light intensity constant. This intensity is defined by the output of the light source. The exposure time is graduated, and in both methods a disk provided with cutout segments placed between the light source and the photographic emulsions admits the light for different lengths of time on different parts of the emulsion. In this manner a time scale is impressed on the emulsion. Eder and Hecht chose the exposure time constant and varied the light intensity by means of a gray wedge placed in front of the photographic emulsion.

The simplification was accomplished in the same manner in the methods of Scheiner and of Eder and Hecht. The sensitivity is characterized by that single exposure time (Scheiner), single light intensity (Eder and Hecht), which produces on the photographic emulsion a density which appears to the eye just higher than the density of a neighboring unexposed point (fog density). The visual determination of this just perceptible density, the so-called threshold value, on the test strip is very uncertain. This

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*Translation from: Die Naturwissenschaften, 21: Oct. 13, 1933, 734-6.

Explanation of the Trichrome Technicolor

Continued from Page 9

The actual operating methods are interesting. The lenses are calibrated with a special system of stop numbers totally unlike any of the systems generally used. The maximum aperture of the standard lens used is arbitrarily taken as unity, and numbered 1; the smaller openings bear progressively larger numbers. However, in order to double the amount of light passed at any given opening—No. 16, for example—one does not open up to the next smaller number, but halves the indicating digit—in this case, opening to No. 8.

On all interior scenes, arc lighting is used almost exclusively. The method of computing the exposure—which is an even more vital factor than in monochrome cinematography—is unusual. A standard Weston illuminometer is used. This is a photoelectric light-measuring device, operating on the same principle as the familiar Weston photronic exposure-meter, but more sensitive, and calibrated to read in lower brightnesses. This is placed in the position of the subject, and three separate readings are taken: one with the photocell pointed directly at the camera, one aiming 45 degrees to the right, and another 45 degrees to the left. These are averaged, and this average forms the basis of the exposure calculation. If necessary, of course, special readings are taken in shadow areas, and the like, as the exposure latitude of the process is not so great as that of ordinary black-and-white. A further important factor is the color of the objects and surfaces being photographed, as the reflectivity of different colored surfaces is more important than in monochrome. When working out-of-doors, the illuminometer is fitted with a neutral-density filter, to offset the excess illumination from the sun.

Inevitably, natural-color cinematography requires a good deal more light than is normally used in monochrome. Exactly how much cannot be said, due to the extreme variations in the lighting technique of individual cinematographers. It is understood, however, that photometric measurements recently made by an impartial observer have shown that the light intensity used for black - and - white cinematography by some cinematographers, and that normally used on sets where three-color Technicolor is being used, are very nearly the same. Mr. J. A. Ball, Technicolor's Chief Engineer, states that the three-color process requires only a slight increase in illumination over the standard normally maintained for black-and-white by the average "heavy lighter."

However, the process demands much more careful attention to lighting balance than does black-and-white. The lighting must be extremely even; brilliant, but with neither excessive highlights nor shadows. The high-lights, especially, must be watched, lest they be "washed out." Back-lighting, while effective, is not generally used in anything like the degree normal in monochrome cinematography. In exterior scenes, a three-quarter cross-light seems preferred, though back-lightings, when amply balanced by reflectors or booster-lights, are often very effective. Colored light, while it plays surprising tricks with the color-rendition of objects upon which it falls, can be extremely effective if intelligently used.

It is perhaps expressive of the confidence which the Technicolor authorities have in their new process that they have executed an abrupt about-face in their policy as regards camera personnel. Heretofore, it will be remembered, Technicolor maintained its own camera staff of specialized Technicolor Cinematographers, Operatives and Assistants, who were sent to any studio making Technicolor pictures, and had complete physical charge of the camerawork, though the Technicolor Cinematographer usually cooperated with a Directing Cinematographer from the studio's staff in the photographic direction of the film.

Now, however, Technicolor's policy is to be different. According to Mr. Ball, Cinematographers, Operatives and Assistants from the major studios (and possibly some free - lance Cinematographers of standing, as well) will be invited to the Technicolor plant, and given a special course of instruction in Technicolor cinematography. In the end, it is hoped to have a complete Technicolor-trained camera-crew in every major studio, so that when a producer decides to film a production in Technicolor, he will be able to entrust its photography entirely to members of his own staff. This policy should be of great benefit to Technicolor, for it will not only develop greater variety and individual style in Technicolor productions, but it will also eliminate the divided responsibility (and its inevitable friction) which seemed inseparable from the old arrangement.

According to Cinematographers who have already used the new process, it is extremely easy to master, and very practical. Ray Fernstrom, A.S.C., recently spent several months in Europe, filming travel films in three-color Technicolor for James A. Fitzpatrick Traveltalks (MGM release). He states that before he left on the trip, he was able to photograph only 1,000 feet of tests—which constituted his only introduction to the practical aspects of the process. Thereafter, he photographed thousands of feet of film, under unfamiliar conditions, with no failures or difficulties of any nature. Moreover, he remarks, the camera stood up, not merely under the normal treatment incident to such a tour, but under the far from tender ministrations of French baggagemen, who do not consider any package set down unless it bounces at least a foot!

The laboratory manipulation of trichrome Technicolor allows at once both more and less control than is usual in ordinary work. The three negatives are developed by machine, to a rigidly fixed time. A very considerable degree of control is possible in printing, however, not alone over density, but also over the color-balance.

The prints are made by the imbibition process. In this process, a matrix is made from each of the three color-separation negatives, by printing onto a special film coated with dichromated gelatin instead of the conventional emulsion. This is "developed" in warm water, which causes the portions affected by the printing-light—that is, the shadows—to expand, forming a relief image. This matrix is then dyed—each matrix being dyed the **complementary** color of its negative: the red negative's matrix being dyed cyanin blue-green; the green matrix, magenta; and the blue matrix, yellow. The three matrices are then successively printed in accurate register onto clear film: as each matrix has absorbed its dye only in the relief portions of its image (that is, in the shadows), it prints only where the original negative has recorded little or no color, while its complementary-colored matrix prints in the color actually recorded by the first separation-negative. (In this stage, incidentally, the word printing is used in the printer's sense, for the matrices print in exactly the same general manner as type.) When the positive has been so printed, and dried, it is complete, and ready for use.

During the Technicolor boom of 1929-30, there was a great deal of dissatisfaction with imbibition prints, due largely to the "bleeding" of the colors, to lack of sharpness, and to the absence of uniformity of color. The greater part of these difficulties, however, have been overcome, and modern "IB" prints are generally quite pleasingly sharp, with a minimum of bleeding and color-variation.

A great deal of control is possible through the processes of matrix-printing, dying and printing, and the density and color-balance can be modified almost as much as is the density of a normal black-and-white print. Colors can be increased or decreased; a strictly accurate rendition can be had, or a

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chromatically distorted one, for special effect, can be produced.

At present, the cost for photography and print of trichrome Technicolor is high: approximately thrice that of monochrome. Naturally, three times as much negative must be used as would be necessary for black-and-white. This is understood to cost 7½c per foot. Negative developing is stated to cost 2c per foot, while rush printing is priced at 12c per foot, with release-printing figured at 5½c per foot. These charges will undoubtedly lower as the volume increases. The cameras are, of course, provided on a leasing basis. At present, there are nine of the three-color cameras ready for use (complete with blimps), and several more are in process of construction. With the present policy, no large camera staff will be built up: the present staff, possibly slightly augmented, will probably be retained, with, of course, an adequate mechanical staff for repairs, etc., consulting color Art-Directors, and the like: but hereafter, the majority of Technicolor films will be photographed by the men already in charge of camerawork in the major studios.

CREATING MOODS WITH LIGHT

Continued from Page 7

beam-concentration rather than substituting a unit of another type. The same applies to the "hard" arc-light, which is, however, extremely useful for photographing dead, heavy blacks, such as formal evening dress, for the bluer light of the arc reveals more detail in the black masses than does the more easily absorbed incandescent light.

Similarly, it is by far the best practice when working on a sequence in which a definite source-lighting has been established, to adhere closely to this source-light pattern throughout, substituting, perhaps, smaller units, greater diffusion, or less concentrated beams in the closer shots, rather than altering the source-pattern and considering the closer shots as more or less independent of the basic long-shot.

These observations, however, are purely elementary, and have only a rudimentary bearing on the discussion. The real art of lighting for mood and tempo must depend primarily upon the individual Cinematographer's artistic sense, and upon his ability to visualize in terms of lighting.

Since the majority of Cinematographers have developed this faculty to a marked extent, it would be of incalculable benefit to the Industry if more Producers and Directors made it a rule to consult the Cinematographer earlier in the preparatory stages of production, and to allow him more ample time to familiarize himself with the script before actual filming commences. There would result, of course, an immediate commercial advantage gained through more complete pre-production cooperation between the Cinematographer and the Art-Directors and Costumers, in that the physical production and the photography would be better coordinated beforehand, with less need of alterations during actual shooting. But mechanical details—while vastly important—are actually secondary to the importance of visualizing the artistic treatment of the production. A vital phase of this, incidentally, is the coördination of this treatment with the style and concepts of the Director. Given the same script and physical production, two Directors might turn out radically differing productions, each of which would demand basically different photographic treatment, to suit the differences in dramatic mood, tempo and general conception. The story of "Cleopatra," for example, might have been interpreted in innumerable different ways by different Directors: one might have chosen to concentrate upon the purely emotional phases of the character, while another might have made **Cleopatra** herself of secondary importance to Caesar and Antony. In either case, the photographic treatment—especially the style of lighting — would have to be basically different. Cecil De Mille, in his recent production of the story, which I photographed, emphasized yet another angle: the fact that Cleopatra was essentially a "showman," who instinctively dramatized her every surrounding, and amazed the luxurious Roman world with her calculatedly lavish display of Egypt's incredible wealth. Thus in this production, the photographic keynote was richness, and in every scene—even the most dramatic—the lighting was kept richly brilliant, to keep the audience subtly aware of the splendor of the settings and costumes. Similarly, Cleopatra's entertainments of Caesar and Antony were lit and photographed primarily as sensuous spectacles, the high-lights of her exhibitionistic nature.

I have photographed many of Ernst Lubitsch's sparkling comedy-romances, and more than a few similar stories directed by other Directors. Few, if any, Directors can impart to action and dialog the peculiarly brittle brilliance which characterizes Lubitsch's work; and where one might stress the romantic phases, requiring much softer lighting and photographic treatment, and another might play everything for broader comedy, requiring more conventional, highly-keyed lighting, Lubitsch's own style demands an equally distinctive, scintillating bril-

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liance in photography and lighting which is rarely applicable elsewhere.

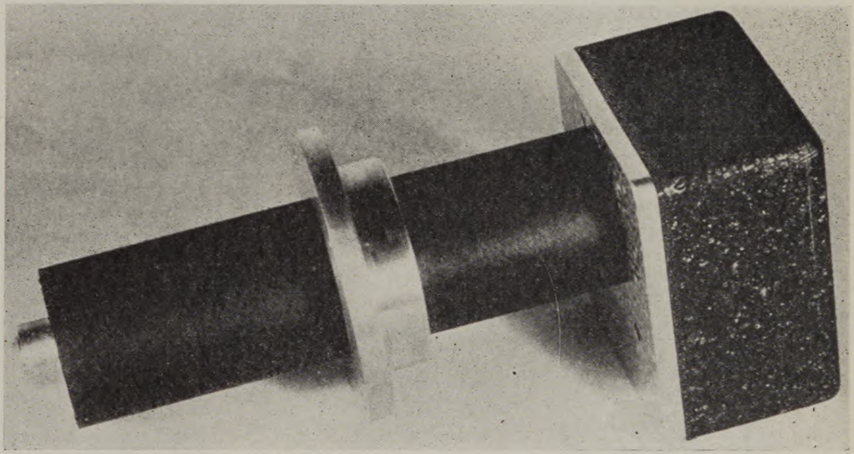
About the time that this appears in print, I expect to begin photographing Cecil De Mille's "The Crusades." While like most of De Mille's pictures, this will naturally stress the spectacular element, the interest (photographic as well as dramatic) centers mainly on two outstanding men—Richard of England and Saladin, the Saracen. This has a very important bearing on the photographic treatment of the film; especially upon the camera-angles and the lighting. Through my study of the script, and my daily conferences with Mr. De Mille, the Art-Directors, Costumers and others, I am carefully building up a mental image of the picture—scene by scene—as I want it to reach the screen. I am trying to visualize every angle, every phase of lighting, so that when I actually film each scene, I will have a definite, mental plan of the technical steps that must be followed so that the lighting will not only be in tune with the dramatic mood and tempo of the action, but will bring out the fundamental traits of each character.

The two principal characters are in every way of heroic proportions. Richard the Lion-Hearted, King of England and Duke of Normandy, characterizes the epitome of European Chivalry of the Middle Ages. Saladin, Sultan of Egypt, represents all that was Knightly in the more highly cultured Saracenic nation. Both characters represent the flower of hardy, virile manhood, and tower above their fellows in body and in character. This gives an unusual opportunity for psychologico-dramatic cinematography. Strength and virility must predominate in the lighting of these men, who should be shown in strong relief against the pictorial, but less commanding background of the period and of their followers. To this end, I hope to depart from the conventional lighting technique; instead of avoiding contrasts and strong shadows, for instance, I plan to heighten them and to use them to express visually the strength of the two men. Using as little as possible of the conventional flat front-lightings and outlining back-light, I plan to simplify my personal lightings, throwing features into strong relief, modelled by heavy shadows that emphasize the note of ruggedness.

To this end, I expect to use very little diffusion, either in the camera or on the lights, and instead of carefully eliminating all the resulting shadows under cheek-bones, noses and chins, I plan to foster them, using them for dramatic effect. Wherever possible, I intend to enhance the effect of towering physical strength, so that these men tower physically as well as dramatically above the other players. One scene in particular creates an especially strong mental picture in my mind: the scene where the two meet for a parley, surrounded by their aides. As I visualize the scene, the two men stand together in the center of the picture, strongly, boldly illuminated, and towering above their men, who are grouped behind them in a semicircle, partly obscured in shadow. The strength of the characters of Richard and Saladin can be expressed quite as much through the lighting as through dialog or action.

On the other hand, the women in the story demand the softest, most delicate lighting possible to fittingly express the Medieval ideal of womanhood. The "emancipated woman" of today was nearly ten centuries in the future, and the twelfth century Chivalric concept of womanhood was as of something fragile, ethereally lovely; almost too wonderful for the rough men of the period to even touch. This concept can be carried out in the lighting: soft, delicate lighting, possibly higher keyed and attuned to a greater degree of photographic diffusion. The contrast between the virile, almost harsh photographic rendition of the men, and the delicate, pictorial presentation of the women should go a long way to establish in the audience-mind this important dramatic contrast.

All of these concepts can be carried out in the personal lighting—the light-



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ing of the players—while, like a musical undertone, the lighting of the settings synchronizes with the dramatic tempo of the action. Where the action moves at a dramatically swift pace, the set-lighting can be of a relatively high key; where it grows melodramatic, there can be greater brilliance in the general lighting. Where the action moves at a slower tempo, the lighting can strike a lower key. Moreover, the spirit of the period can likewise find much expression in the lighting. The buildings of the time were built for defense, rather than comfort; accordingly, the only illumination within them was from torches and candles, aided, in the daylight hours, by thin shafts of sunlight filtering in through tall, narrow windows and loop-holes. To be historically correct, the lighting of such sets will have to reproduce, in some measure, this known condition—and the photographic effects so produced will convey a perfect visual impression of the rough hardihood of the age. With this background for the light-treatment of the players, there is an unusual opportunity for true dramatic cinematography and lighting.

THE DIN-SCALE

Continued from Page 11

point on the curve is dependent upon the absolute light intensity, and therefore upon the light source by which it is read and upon the amount of the fog density. (See the range indicated in Fig. 1 by Schaeffur.) 3. The primary light energy (intensity x time) employed is accurately constant, since a definite quantity (2 mg) of Mg-ribbon is burned.

Finally it must be emphasized that this kind of evaluation of the speed is not good in practice. In picture photography it is not so very essential to know what exposure is required to produce a just visible impression on the emulsion as, the much more essential quantity, what exposure produces a good image. For the evaluation of speed according to the Hurter and Driffield system, a tangent to the density curve obtained from the exposed sensitometric strip is constructed. For the determination of the H and D sensitivity number, the number 34 is divided by the light energy measured in m.c.s. corresponding to the point at which the tangent crosses the abscissa. Apart from the consideration that this method of speed determination is very bothersome on account of the necessity of constructing the entire density curve, the value obtained does not correspond to that which in practice corresponds to sensitivity. So much trouble has arisen from the sensitometric systems spoken of, that it was resolved, in Germany, to produce a new method. The problem was to find a system of sensitometry capable of exact reproducibility of speed number, one which designated the sensitivity of a photographic emulsion in a useful manner for practice, the system to be adopted for perhaps three years by the German Society for Photographic Research and executed by one of its committees on sensitometry. The numerical value necessary for practical work has been worked out in detail in the laboratories of the Scientific Photographic Institute of the Technical High School of Dresden, the I.G. Farbenindustrie A.-G. (Agfa), and the Zeiss Ikon A.-G. also with the support of the Perutz G.m.b.H. A description of this work is to be found in an article by R. Luther in the Proceedings of the VIII International Congress for Scientific and Applied Photography, 1931, in Dresden. For an account of the

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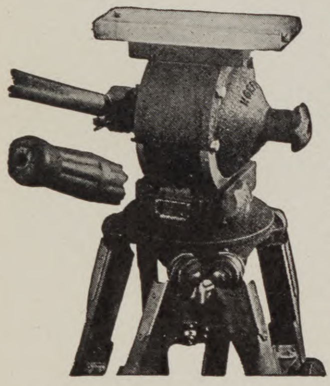
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details, the reader is referred to this article. From this point forward this new method of speed determination shall be considered with reference to the formerly outlined three simplifications.

1. The light source used possesses approximately the same spectral distribution as sunlight. It is obtained by means of a vertical filament tungsten vacuum lamp at a temperature of 2360° Abs. in combination with a liquid Davis and Gibson filter. The energy distribution of this light source in combination with this filter is compared with the energy distribution of the sunlight measured by Abbot.

2. The exposure time is constant and amounts to 0.050 sec., the light intensity is graduated by a gray step wedge in contact with the emulsion to be tested. The step wedge has 30 steps, each 4 mm. wide, which carry numbers 1-30. The first step (No. 1) has the density 0.10, the second a density 0.20, etc., the last step (No. 30) a density 3.0.

The density difference between each third step amounts to 0.3, the ratio of the transparency of the first to the fourth step, the second to the fifth step, the fourth to the seventh step, etc., has the value 2. The apparatus (Zeiss Ikon) which is employed for making the exposures has been described by Gothel and Seifert and is shown in Fig. 3.

3. The sensitivity is characterized by that energy for square cm. of emulsion surface, which is required to produce a density of 0.1 above fog. For the determination of this energy, it is not necessary to plot the density curve as in the case of the Hurter and Driffield method of evaluation; instead, one proceeds by laying a comparison strip of density 0.1 on the unexposed part of the sensitometric strip (image of the gray step wedge) and places it optically adjacent to the density scale. The number of the step which has the same density as the fog plus the comparison density, characterizes the sensitivity and gives the DIN-Speed of the photographic emulsion considered. Bringing the two densities optically adjacent may be accomplished with the help of a biprism. The higher the number read, the higher the sensitivity of the emulsion and indeed a jump of three step numbers designates a rise by a factor of 2 in sensitivity. The choice of the density 0.1 above fog has various bases. A specification of sensitivity based on this value of density has regard for the rendering of shadow detail, which is absolutely necessary for the attainment of pleas-

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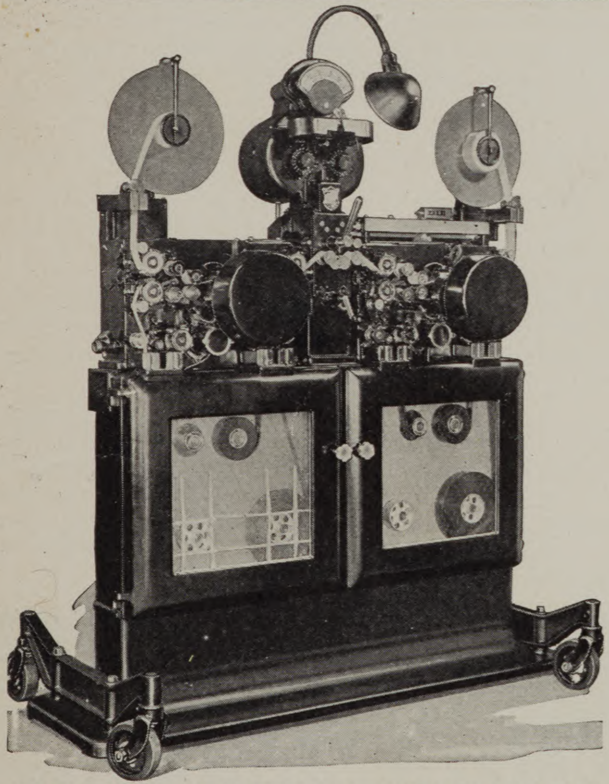

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ing pictures, while a good rendering of the mean tones and high lights can be obtained through proper choice of the printing materials. In addition, extensive research, which has been carried out, especially in Dresden, shows that the differences in sensitivity of the emulsions which are available for practical photography can be quantitatively represented by the DIN-scale. A very important advantage of the method outlined consists in the fact that by this method the eye is not employed as an "absolute instrument" for the observation of a threshold value, but as a "null instrument" in which it has the task merely of observing the equality between densities. Hereby individual differences should be largely eliminated.

In contrast to all former systems of sensitometry, the method of development of the sensitometric strip is here accurately specified. The developer is sulphite metol-hydrochinon developer and optimal development is to be given, i.e. development for such a time that the highest possible DIN-number is obtained. However, the density of the fog is not to be higher than 0.4 in case it is not specified under the DIN-Speed by the factory.

The sensitivity of a photographic emulsion can be accurately determined to ± DIN-number. In order to furnish latitude for a small loss of sensitivity of an emulsion during storage, a tolerance of 3 DIN-steps has been established, i.e. for a later test it is permitted that the sensitivity be (at the most) 3 steps-DIN lower than it was given by the factory. An arbitrary sensitivity change (to one-half) is insignificant in comparison with the enormous exposure latitude of many modern photographic emulsions.

The problem of DIN-speed, as well as a trustworthy sensitivity designated for photographic emulsions, has long been desired. This must be seen as a real and, for the practical photographer, very delightful advancement.

PHOTOGRAPHY OF THE MONTH

Continued from Page 10

"NIGHT LIFE OF THE GODS" (Universal)

John Mescall, A.S.C.: Directing Cinematographer

Hollywood Reporter (December 7, 1934): "The photography is fair."

Daily Variety (December 7, 1934): "Photography of John Mescall is excellent, particularly the process footage of the transformations."

"MYSTERY WOMAN" (Fox)

Ernest Palmer, A.S.C.: Directing Cinematographer

Hollywood Reporter (December 7, 1934): "Ernest Palmer's photography is at all times interesting."

Daily Variety (December 7, 1934): "Photography is excellent, particularly night shots at sea."

"LITTLE MEN" (Mascot)

Ernest Miller, A.S.C.: Directing Cinematographer

Daily Variety (December 7, 1934): "Photography by Ernie Miller and William Nobles is excellent."

"BIOGRAPHY OF A BACHELOR GIRL" (M-G-M)

James Wong Howe, A.S.C.: Directing Cinematographer

Hollywood Reporter (December 15, 1934): "And James Wong Howe succeeds in making things look their best with his photography."

Daily Variety (December 15, 1934): "Photography of James Wong Howe is above par, particularly his exteriors."

CRONJAGER PASSES

Jules Cronjager, 62, veteran cinematographer, died at his home Christmas night following a heart attack after being ill for several weeks.

Cronjager had been a cameraman for 25 years. He is credited with some of the big productions of the industry during the silent days. He is survived by his widow and a brother Henry. Edward Cronjager, A.S.C., of the RKO Studio, is his nephew.

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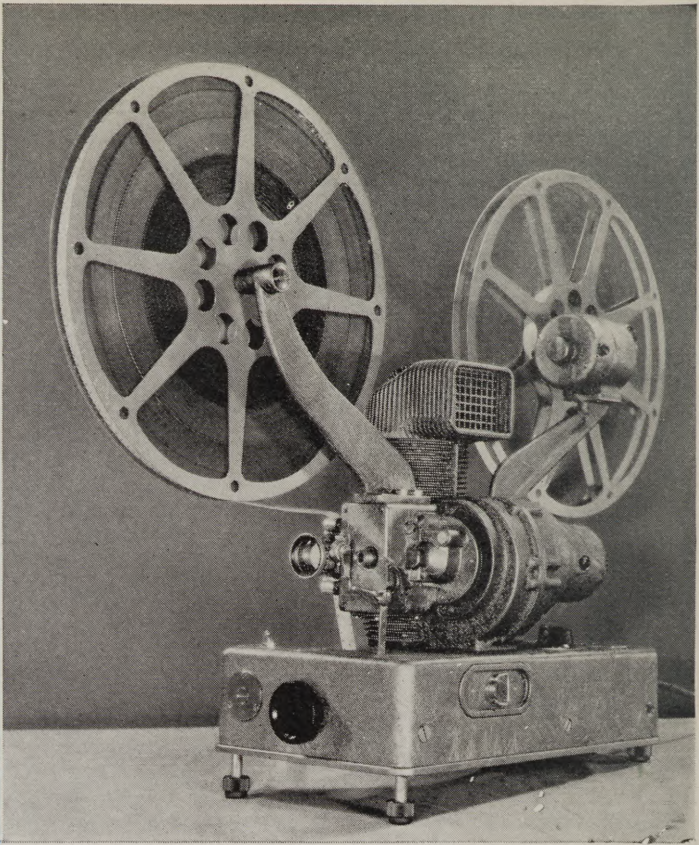

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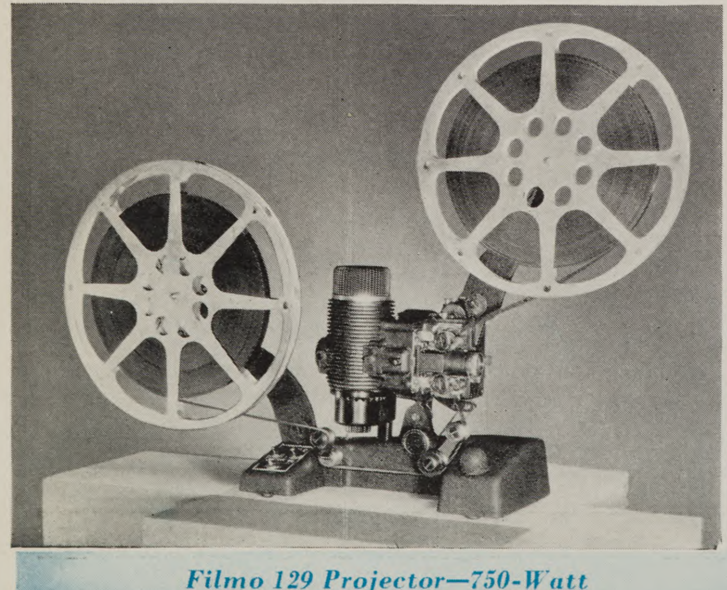

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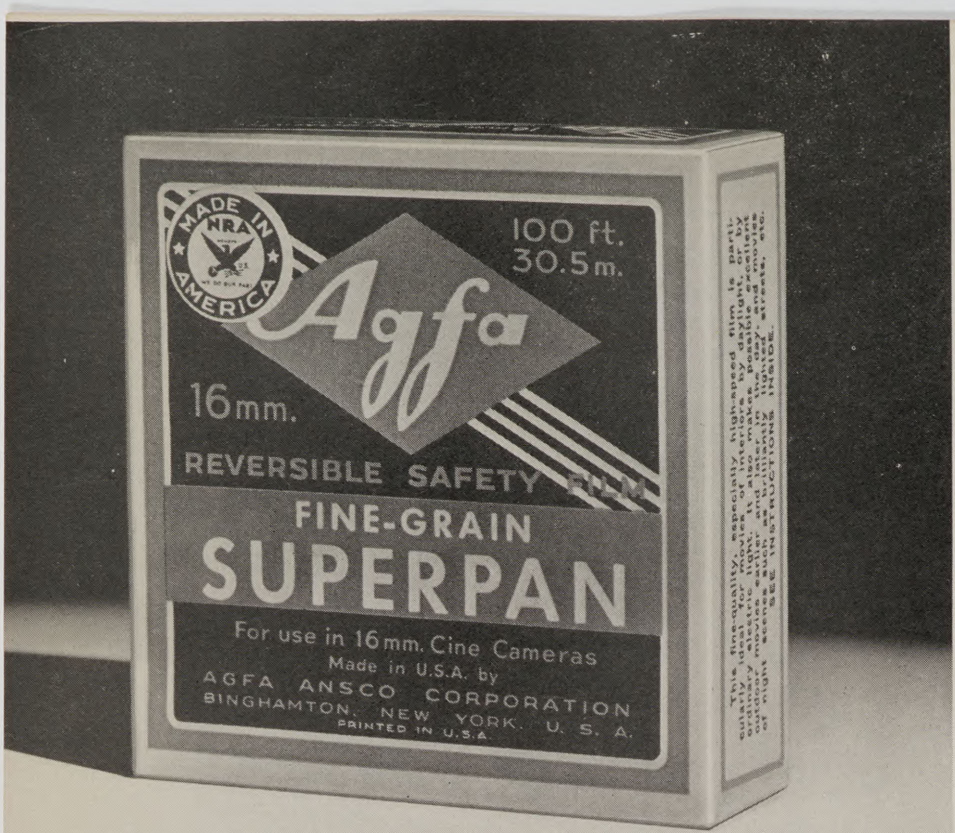

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AMATEUR MOVIE SECTION

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PROFESSIONAL Criticism of the Amateur picture is a part of the service offered by the AMERICAN CINEMATOGRAPHER. Many are not aware of this. Hundreds of pictures have been reviewed this past year by members of the American Society of Cinematographers for the Amateur.

Next Month . . .

- We will give you the details of the 1935 Amateur Movie competition. There will be a little change in the date and a little change in the classifications. Everything will be simplified more.

- There will be articles pertinent to problems you encounter frequently. We will tell you something more about animated cartooning and how sound is synchronized with the action

Equipment Prizes Awarded

DURING the past month the judging committee of the American Cinematographer 1934 Amateur Movie Makers Contest completed its work and designated the winners of the equipment prizes and those who were to receive Honorable Mention.

The prize given by Eastman was awarded John E. Earl for his picture "The Traveler." This picture was selected because it was felt by the committee that it not only was a good travel subject, but also one that had as its central theme the family of the producer.

The Bell & Howell prizes according to the rules went to the winners of prizes in the cash awards to those who used Bell & Howell cameras.

The Victor Animatograph Camera was given outside of the regular awards. In every case where this was possible the committee attempted to separate the equipment awards from the cash awards. "Footsteps" would easily have won in one of the classifications, but the picture was of a calibre that the committee believed should receive a higher award.

The Agfa contributions were also rated in the same way. If the picture was made on Agfa film it was first put in the class to be judged for the Agfa prize as that prize was greater than the cash prize except in the case of the first winner. Under this arrangement Mr. Nixon of Cleveland, Ohio, was given the prize of the Super Pan film for his fine picture "Christmas." This combined fine photography, both interior and exterior, with a splendid record of the holidays. In view of the fact that the Calvin Co. award came under this same classification Mr. Nixon also won that prize.

The second prize of the Agfa Ansco Corp. went to Arthur Wolff of Chicago for his film "All for Beauty," a documentary picture.

The Harrison & Harrison prize was awarded to Chas. E. Coles and Robert Coles of New York City for their picture "Rainbow Trail." Last year these two gentlemen won the second prize for photography.

The Craig Splicer and Rewind went to W. McFarlane of Rochester for his picture "Two Tramps Abroad," a splendid record of a honeymoon trip cleverly edited and titled.

The Sunny Schick prize of one Model M.S.A. Electrophot went to J. J. Urban of Ft. Atkinson, Wis., for his picture "Our Family."

In addition to these prizes the committee felt that the following were highly deserving of Honorable Mention:

Allan F. Seaver, New Bedford, Mass., for his picture "New York City."

Dr. Harold F. Kaufman, San Francisco, Calif., for his picture "Around the Clock with Muriel."

C. J. Kostich, Long Island City, N. Y., for his picture "Peasants."

Dr. S. H. McAfee, New Orleans, La., for his dental picture.

Delmir DeCaralt of Barcelona, Spain, for his picture "Memmortigo."

Claude W. A. Cadarette, Los Angeles, Calif., for his picture "California Missions," an 8mm subject.

Cinema Club of San Francisco for their picture "Shades of Bacchus."

Joyn F. Criswell of Los Angeles for his picture "America Thru the Ages."

M. P. Gamber, Grand Rapids, Mich., for his 8mm picture "Hooked."

Continued on Page 35

Equipment Winners

Eastman Model K-75 Projector, Value $235.00, to John E. Earl, for his picture "The Traveler."

BELL & HOWELL, Merchandise to the value of $125.00 to Van Dee Sickler for his picture "Mischief."

Bell & Howell, Merchandise to the value of $75.00 to H. Demarest of Hackensack, N. J., for his picture "Story of Water."

Victor Animatograph Corp., Model 5, 16mm Camera with f2.9 lens, value $175.00, to J. R. Coming, St. Louis, Mo., for his picture "Footsteps."

Harrison & Harrison Universal Filter Holder and set of Multi Filters, value $14.00, to Chas. H. Coles and Robert Coles, New York City, for "Rainbow Trail."

Craig Movie Supply Co., Senior Rewind and Splicer, value $19.50, to John W. McFarlane, Rochester, N. Y., for "Two Tramps Abroad."

Agfa Ansco Corp., 12 one-hundred-foot rolls Super Pan Reversible 16mm film, value $94.00, to C. E. Nixon, Cleveland, Ohio, for "Christmas."

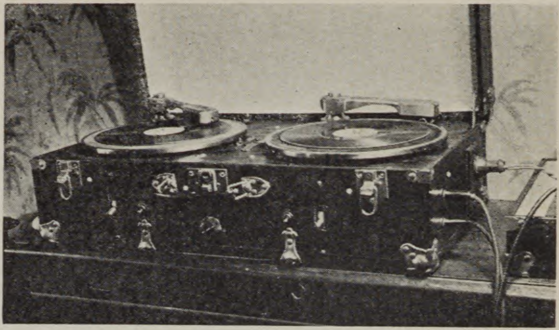
Agfa Ansco Corp., 12 one-hundred-foot rolls Plenachrome Reversible Film, value $54.00, to Arthur Wolff, Chicago, Ill., for his picture "All for Beauty."

The Calvin Co., Complete Set of Tailor Made Titles, value $50.00, to C. E. Nixon, Cleveland, Ohio, for "Christmas."

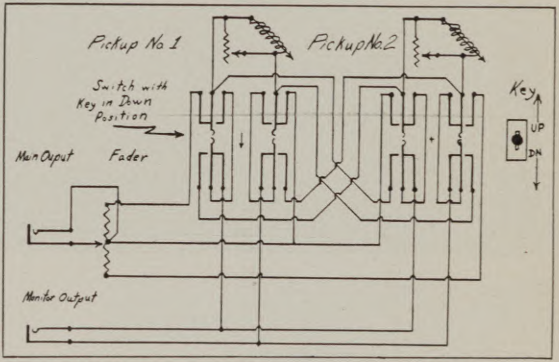
Sunny Schick, one Model M.S.A. Electrophot, value $17.50, to J. J. Urban, Ft. Atkinson, Wis., for "Our Family."

Non-Sync Setup for Silent Pictures

by
Arthur H. Smith



The dual turntable case, showing the input A. C., the two output jacks and patching cords. The two off-on switches, two control switches and the fader. The pickups and motor turntables are mounted on the top.



Wiring Diagram for Dual Turntable.

THE following describes a "non-sync" setup which is portable and which incorporates a monitoring circuit and a feature whereby sound effects may be simultaneous with the background music. This arrangement is built into two cases for ease in transporting and is very convenient for temporary setups.

Two plywood suitcases about 24"x15" are used to house the complete setup. The first case contains two 33 1/3-78 r.p.m. electric turntables, two electric pickups and the associated wiring. The second case contains the amplifier. This amplifier is really two amplifiers. The first, or main amplifier, is for the sound and the second is the monitor amplifier.

The operator, at times, wishes to pick out sections of a record for accompaniment with the picture. In this system I have provided a means whereby the operator may monitor on the incoming pickup with a pair of headphones and find the exact spot for setting his needle. For instance the action might be slow and light, then a fadeout and a quick fadein on fast exciting action. One record may have fast exciting music about halfway in it. Yet, the operator will not wish to play the first part of this record as a better record may be on hand for the slow action preceding the excitement. So, he plays the slow music, sets the incoming pickup about where he wishes to pick up the hurry-hurry and listens for the start and then fades over to catch the opening notes.

Two outlet jacks and a 11°V. A.C. input are mounted on one end of the turntable case. One output jack is connected by means of a patching cord to the input of the main amplifier and the other output jack is connected by means of a second patching cord to the monitor amplifier. The input for the 11°V. A.C. is an ordinary outlet receptacle and a special cord is made up with two male plugs for connecting to a power outlet. Each motor has its own on-off switch. Each pickup comes with a volume control as part of the pickup assembled in one unit. Therefore, no volume controls need be mounted on the case. However, for each pickup circuit there is a four-pole three-position switch. For this switching arrangement a Kellogg anti-capacity switch may be used, but, a slight adjustment will have to be made on the inner contacts. These must be bent so as to contact with the swing arms when the key is in the center position. The diagram of the turntable case shows such a position on the right hand pickup while the left hand pickup in the diagram has the key in the down position.

Here is an explanation of operation.

The amplifier and speaker are set up, and the dual turntable case is connected with the patching cords. With the key associated with its particular pickup in the down position that pickup is on the main amplifier channel and will feed music into said channel provided the fader is turned to that pickup. With the key in the center position the pickup is on the monitor channel and can be heard in the headphones. With the key operated up it throws the pickup in parallel with the playing pickup. This is used in the following case. The action on the screen shows a train thundering along a track. Background music is being played. Now, as special records may be secured for almost any type of sound we will say a record has been secured for a train whistle. That is put on the vacant turntable and the motor started. Now at the critical moment the key is thrown up and through the background music will come the "toot-toot" of the train whistle.

The amplifier is built into one chassis. It is mounted in the cover of the second case and the loud speaker is mounted in the base. It will be necessary to remove the hinges and replace them with clasps similar to those on the front of the suitcase. These may be obtained in a suitcase repair shop. Then, the speaker may be detached and placed near the screen.

The main amplifier consists of 2-56's into 47's in push-pull and the 80 rectifier. The monitor amplifier is a single 56 into a single 45 with its 80 tube. The monitor amplifier also supplies field to the dynamic speaker. Of course, variations can be used. The main thing is to supply two amplifier channels so that one amplifier channel is available for the sound while a second channel is available for monitoring. If an A.C. speaker is used then of course it is unnecessary to supply field from the monitor amplifier.

If it is desired a microphone may be fed into the input of the amplifier for explanations during the picture. A mike transformer and battery is all that is necessary and this may be built into a small box which will fit into the amplifier-speaker case when transporting.

Music with pictures improves their entertainment value about 50%.

Let's Talk

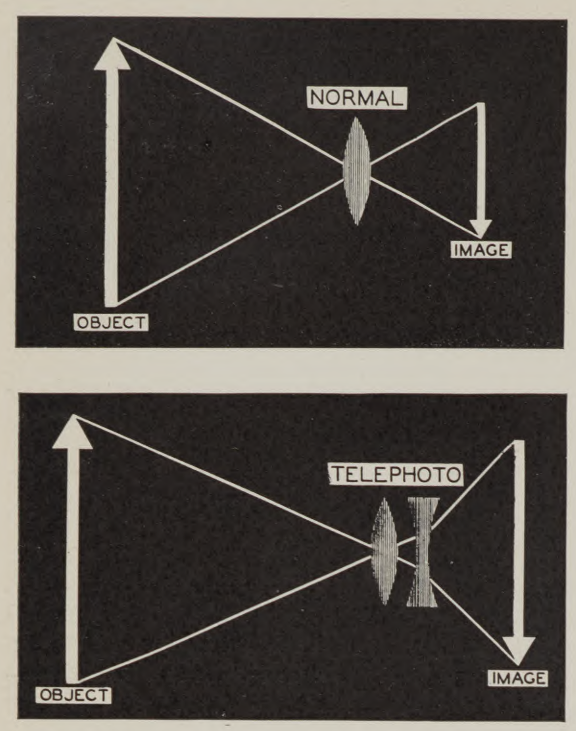


Figure 9. By combining a dispersing lens with a converging lens, the telephoto effect of enlarging the image is obtained without correspondingly longer mounting length and large diameter required by a normal long-focus lens.

IN THE first two articles of this series in which we have become better acquainted with the whys and wherefores of our camera lenses, the rudimentary optical faults of the single common lens have been discussed with the idea of realizing more fully why the lens of our cameras is so important to the quality of our picture work. And, altho intricate mathematics was purposely avoided, the discussion at least, I trust, has made us aware of the problems confronting lens designers and manufacturers, and perhaps their ceaseless efforts to supply us movie fans with better and better lens equipment have increasd our respect for their talents.

The third article of the series (which appeared in last month's AMERICAN CINEMATOGRGAPHER) was an attempt to learn, in at least cursory fashion, the progress which has been made in modern lenses, with illustrations of the general types of modern anastigmats. In order to correct for as many optical faults as possible simultaneously, groups of lens elements were combined in proper manner, to be followed by later advances which increased the speed of lenses without increasing the aberrations by the simple expedient of selecting glasses and shapes which minimized the number of lens elements and thus increased the optical efficiency.

This month we shall discuss in more particular fashion two special members of the lens family—the wide angle and the telephoto lens.

When the gasoline-powered conveyance was first marketed, it was offered in only one body style, the two-seat open model. It was the plaything of the rich and nothing more. With the spread over the country of such a convenient mode of transportation, people not-so-rich visualized the motor car as having possibilities in other directions than the mere Sunday-promenading of the first models. The salesman who seldom had a passenger found a roadster or single-seat model more easily maneuvered bcause of its smaller size. Families in wet or cold weather began to demanad more comfort in their transportation. Trucking companies realized that different models of the motor car might be built to more economically and more quickly carry heavy burdens of freight than the horse-drawn vehicle could accommodate. In short, the more general and widespread the knowledge of the advantages of motor transportation, the more widely varied became the models of the motor car.

The amateur motion camera and its lens are paralleling the history of the motor car in that as more and more enthusiasts are recruited into the field, the more widely varied are the models of cameras and lenses which manufacturers offer. Up to a certain point in this evolution, there is a great deal of healthy competition, but beyond a certain saturation point, there will be the reverse swing to simplicity.

Just at present, there are so many different focal length lenses on the market that there is actually sales resistance to all cine amateur equipment. Perhaps I should modify or qualify that statement by the explanation that because so little is told of the reasons for the existence of all these lenses, there is a definite reaction against getting into the game because "it's a rich man's game."

But we don't shy away from owning a modest automobile just because the rich man's equipage consists of a town car, a country car, and a few incidental pieces of motoring equipment do we? We might have a longing for a better car, but you can bet your last bottle of film cement that we feel that should we ever be fortunate enough to be financially able to possess more motor equipment, we'll know exactly what we need.

So it is with lens equipment for our amateur movie camera. Until we know more about our possible future needs, we start out with a normal focal length lens, a good, safe choice. But as we aren't ever satisfied with our past and present achievements, it will be a good idea to store away knowledge of what we might need in the future.

And that brings us to wide-angle lenses and telephotos. What are they? Why are they? What good can they do us? If we approach c case full of lenses with itching fingers and loose-stringed pocketbook, let's ask three questions of every lens the dealer shows us, and then blame no one but ourselves if the wrong choice is made in auxiliary lens equipment.

What is a wide-angle lens? Why is it offered to us? What good would a wide-angle lens in our camera be to better filming?

In the first place, a wide-angle lens is a lens which gathers optical impressions for our film in a wider sweep than does our normal lens. A wide-angle lens is offered to us because in interior filming so many amateurs have complained of the regular lens being too "narrow-eyed" to include enough scene taken in our small-roomed modern homes and apartments. If we have a wide-angle lens in our equipment, we can film family movies indoors and

About Lenses Wide-Angles and Telephotos

by

Wm. J. Grace

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get plenty of adjacent scenery to establish the fact that it is really a room and not just a two-walled artificial movie set.

The diagonal of a frame of 16mm film is about ½″. With a 1″ lens (sometimes called a 25mm lens), then, the included angle is about 26½°. If you're mathematically inclined, the angle is the anti-tan of half the diagonal divided by the focal length. Consequently, a 15mm wide-angle lens will cover about 33° on the diagonal (again, the anti-tan of half the diagonal divided by the focal length). It isn't difficult mathematics to prove that 33° is about 25% wider angle than 26½°, and it likewise isn't difficult for the layman to realize that a picture made with a 15mm wide-angle lens will include 25% more scenery all around than the normal 1″ lens.

Why aren't still wider-angle lenses on the market? Simply because the need hasn't developed to such proportions as to warrant paying the salary of a high-priced lens designer or investing in optical grinding equipment necessary to such short focal lengths. When the need becomes great enough, we shall have wider-angle lenses, have no fear. True, the focal length will be so short that the lens may practically ride on the film, but if we want them, lens makers will come thru in fine style, never fear!

As an example of what has actually been done in the way of wide-angle lenses, the Goerz Optical Co. developed a few years ago a lens which was anastigmatically flattened over a field of about 135°! But the Hypergon, as it was trade-named, was not for the 16mm enthusiast, for it overcame the uneven illumination of the film surface (a fault common to wide-angle lenses, but, of course, corrected in commercial lenses) by the complicated expedient of exposing with the film for about 1/6 total time with the lens alone, and the remaining 5/6 was exposed with a star-shaped auxiliary field stop, which was spun in front of the lens by an air blast, swung before the lens. Imagine doing this 16 times per second! One would have to be a bit agile, as it were, would one not!

You wide-angle fans who have been crying for "wider, wider, **wider**" angles to your lenses, digest the above description of a really **wide**-angle lens, and be content with what you have.

And now to the other side of the normal lens—the telephoto lens. What is a telephoto lens? Why is it offered to us? What improvement would come to our filming thru the use of telephoto lenses?

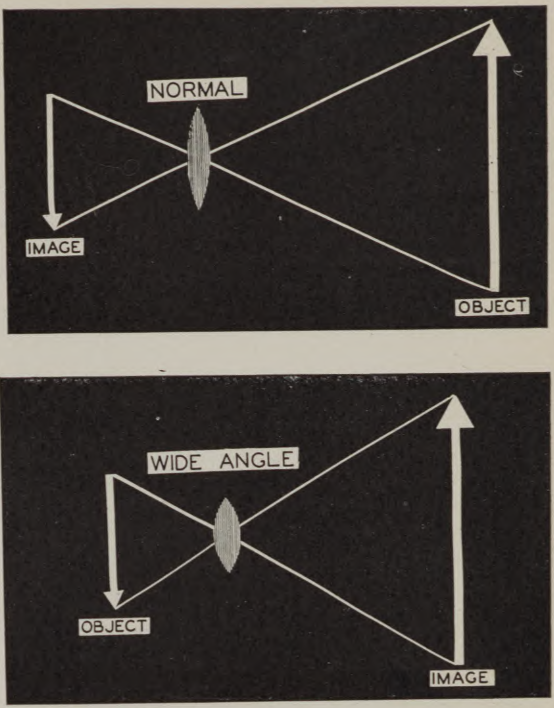

Figure 8. The wide-angle lens "takes in" a wider angle of view than the normal lens. Its chief use is in filming interiors where the camera cannot be backed far enough away from the scene to include the proper amount of surroundings.

Well, a telephoto lens is a hybrid lens, in the first place. It's a long focal length lens with a short focal length mounting tube. It is existent only because we have demanded that even long focus lenses for our tiny amateur movie cameras must be in keeping with the physical dimensions of our compact cameras. Surely, they cost more than a regular lens would cost, because of the extra lens element in it. It is an important lens for us, tho, because it allows us to film objects in a larger size than if we had to depend on the normal lens, from the same camera-object distance.

If you are a still camera enthusiast as well as a movie bug, as most of us in 16 and 8 are, you are familiar with the rather large backward and forward travel of the lens of, say, a 2¼″x3¼″ Graflex having the normal 5½″ lens. Your own camera may be smaller or larger than this and have a correspondingly shorter or longer focus lens, but you do know that the lens on your still camera must travel an appreciably longer distance in moving from perfect focus for a close-up to sharp focus for a distant scene.

As an example, the 5½″ lens of my Graflex moves about 5″ between the extremes of a closeup and a distant object, while my 6″ telephoto on my Bell & Howell only moves about 5/16″ for the same adjustment. Moreover, when racked out to shoot a closeup, the 5½″ Graflex lens is about 10″ or more away from the film, while the 6″ Cooke telephoto is only about 4″ away.

The short mounting of a telephoto lens not only is a boon to the amateur cinephotographer because of compactness, but it does not unbalance the camera as much as would a normal lens of the same focal length. The longer the focal length of a small cine camera lens, the more highly is magnified any slight movement of either the lens or the camera, and if the barrel of the lens is kept short, as is possible with telephotos, there is less danger from lens movement to spoil the shot.

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Formula for Reversing Films

Editor's Note: So many requests have reached us for a formula for reversing 16mm film that we are reprinting herewith the article as it was originally printed in the Cinematographic Annual Vol. 2.

THE making of direct positives, whether by the reversal-film process generally used by amateurs, or by converting an ordinary negative into a positive, consists in making a negative on a strip of film, developing it, and then printing that negative on the same strip and destroying the original negative chemically, but leaving the positive print to be developed, etc., in the usual way.

In 35mm use, where regular reversal film is not available, either negative or positive film may be used, but where the light permits, positive is preferable, as it gives snappier results, although it is not corrected for color-values. As positive stock is far slower than negative, it can only be used under the best light conditions, and always with a much wider diaphragm opening than would be used with negative. It is not recommended for interiors. In any case, the exposure must be rather full.

The apparatus needed is a SOLID drum of metal or wood, painted with a dead black photographic enamel which must be resistant to the action of photographic chemicals. A SKELETON-TYPE DRUM, WITH ONLY RIBS, CANNOT BE USED FOR REVERSAL PROCESSING.

Any high-contrast developer can be used. The following is a good formula:

HYDROQUINONE	1 ounce
Sodium Sulphite (dry)	11 ounces
Sodium Carbonate (dry)	7 ounces
Potassium Bromide	1 ounce
Water	1 gallon
Alcohol	1 pint

The alcohol may be omitted, but permits development at a higher temperature, giving greater contrast.

Development should be slow, by dim, red light, so as to give a snappy negative with pure whites and deep blacks. Be sure to develop fully.

Wash for five minutes or more, to remove all traces of developer.

At this stage, any swelling of the film should be taken up by tightening the film on the drum. Then the film should be exposed to a diffused, white light until the white portions of the film become visibly grayed.

The next step is to destroy the negative image by immersion in:

Water	1 gallon
Potassium Bichromate	1 ½ ounces
Nitric Acid	3 ounces

The film is immersed in this bath until the negative has entirely disappeared, and only the creamy white of the remaining, undeveloped silver bromide is visible. After this, the film must be thoroughly washed, and the final, positive image then developed in the usual manner. This may be done in the same solution in which the negative was developed, or in some softer-working solution.

After this development, the print is fixed and washed in the usual manner.

Another set of formulae, especially intended for substandard reversal emulsions, are recommended by Messrs. Pathe for use with their Pathex system.

The formula for the first development is:

Paraphenylenediamine	150 grains
Sodium Sulphite (crystals)	1 ounce
Caustic Soda	150 grains
Potassium Bromide	60 grains
Phenosafranine (solution 1:1000)	160 minims
Water	35 ounces

If ANHYDROUS sulphite is used, only ½ ounce is needed. There are also several commercial desensitizers, such as "Desensol," etc., which can be readily substituted for the safranine solution required.

This developer must be used at temperatures between 60 and 65 degrees F.

The developer should be filtered before use. Remember, too, that the caustic soda is bad for the eyes, so do not splash the developer.

In developing reversal film, the film should look almost opaque when the development is finished, and the black portions of the negative should appear of almost equal density from either side of the film. The following table will be useful in timing the development:

If the First Signs of Image Appear in:	Develop for
Up to 20 seconds	5 to 8 minutes
30 "	10 "
40 "	12 "
1 minute	15 "
1 ¼ to 1 ½ minutes	20 to 25 "

Reversion is in this case carried out chemically, by use of the following reversion bath:

Potassium Permanganate	30 grains
Sulphuric Acid	170 minims
Water	35 ounces

The acid should be added last in a slow stream, stirring the while. Sodium Bisulphate (380 grains) may be substituted for the acid, but is not so effective.

In reversion the negative is dissolved away and the film takes on a red color. This normally takes from seven to ten minutes, but should in any case be continued until all of the black image is dissolved. If the amateur has both orange and red lights on his dark-room lamp, the red one may be removed after the film has been five minutes in this bath.

After reversion the film is washed until it bcomes a clear yellow—usually about seven minutes. The remaining operations may be carried out in white lights.

The next step is bleaching, by the following formula:

Sodium Sulphite (crystals)	150 grains
Sulphuric Acid	35 minims
Water	35 ounces

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Adapting Professional Lighting to Amateur Movies

Reprod- June 1950 AC

by

Frank Good, A. S. C.

THERE is no gainsaying the fact that the average amateur-movie interior is either too flat, or too excessively contrasty. The fault, in the first instance, is that a general flood of light (from one or more sources) is indiscriminately thrown on the set—with no accentuating shadows or high-lights. In the other case, the light is from a single source, as a rule, so placed as to "burn up" most of the high-lights, and leaving a lot of heavy, black shadows.

Now, how shall we correct this? In the first place, why not begin with a general illumination from two or three well-placed lamps, fitted with silk or tracing-cloth diffusers. This is good insurance against unpleasant shadows; but it won't, naturally, give you anything but a flat, well-illuminated picture. If we want character in it, we will have to build up our high-lights from this foundation.

This is a good start; but now, how about the high-lights and shadows that will give our set character? These can come from other units—not diffused—and placed here and there about the room where their beams will make little catch-lights on irregular wall-surfaces, curtains, archways, and furniture. The various types of inexpensive Photoflood units are fine for this. The light-source in a Photoflood bulb is fairly small, and so the light is intense enough to give a strong beam, which will accentuate our high-lights nicely, and also cast interesting shadows. In addition, Photofloods placed in ordinary table or bridge lamps will add to the naturalness of the effect, putting more highly-illuminated splashes of light in the logical places.

Clearly, if we build our light up this way, we're likely to get so much more than merely enough illumination to make an exposure, that we'll have to stop down quite a bit. Well, why not? Stopping down will give us more depth of focus—and it will also allow us to control the effect we get; closing down will give a darker, more contrasty picture, while opening up will give us a lighter, softer one. The best guide, of course, is an accurate exposure-meter (preferably one of the photoelectric type): normally, follow its reading; but for effects, note the reading, and then modify your exposure to get your effect.

Now let's consider an actual example, and see what can be done under normal conditions. Take the room represented in the sketch—a living-room of average size. Our shot will be made with a 15mm lens, centering on a person seated in a chair, and including a corner of the room. (It is always better to show two of the walls of a room this way, rather than a single wall.) Beside our chair are a book-table, on one side, and a reading-lamp on the other. Now, let's begin to light our picture! What do we want first? Our foundation-light: the soft, general illumination, from which we can build up our high-lights. We will start with lamp "A"—a 500-watt photographic lamp, fitted with a diffuser. Placed as it is, it will give us a nice, soft, general illumination over the picture-area. Used alone, it would give us an even, general illumination sufficient for an exposure—but the picture would be flat and uninteresting. You could balance it, of course, with another, similar unit placed on the other side of the camera-line, and a bit closer to the subject: this would result in a fairly good, ordinary lighting on subject and background. But, if you're like most amateurs, with none too many lamps at your disposal, I think you could get a better lighting for your set with but a single front-light unit.

Now, what do we want next? Well, some high-lights along the folds of that curtain in the background would

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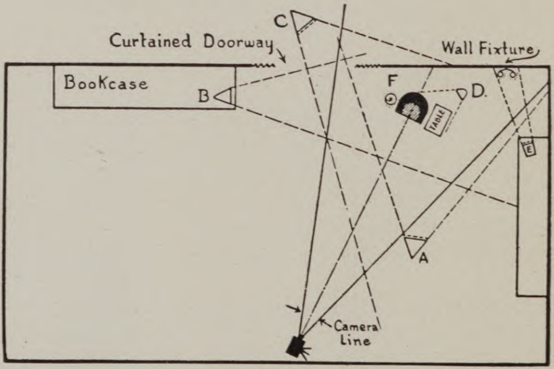

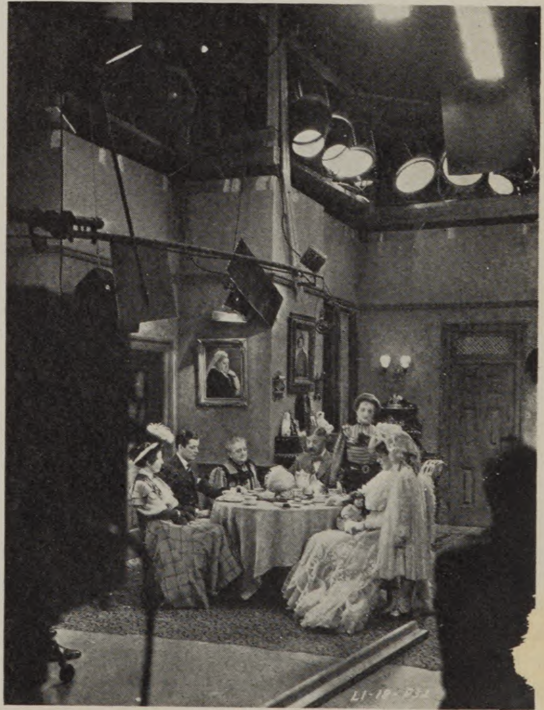

Above—How the Amateur can do it.
Below—How the Professional does it: how Ernest Palmer, A.S.C., set the lights for a scene from "Cavalcade."

WHEELS OF INDUSTRY

Craig Moves

● Craig Movie Supply Company announce the removal of their offices on January 1st to 1053 S. Olive St., Los Angeles, Calif.

This is almost next door to the local Agfa offices. The new and larger quarters were made necessary by the many new pieces of equipment and material that are being handled by this company. In addition to home movie materials the Craig company is also handling still-picture equipment.

Boulder Dam Films

● The Boulder Dam Service Bureau of Boulder City, Nev., announces six subjects available of this project. Some are in 16mm and some in 35mm.

In addition to film the company also has lantern slides of the building of this vast dam.

The 16mm subjects range in length from 100 feet to 2,400 feet.

Changes Name

● Educational Projecto Film Co. of Hollywood has changed the name to Camera Mart. This company has also moved from its former location on Cahuenga to 1611 N. Cahuenga Boulevard.

Agfa Color for Rolleiflex

● According to an announcement from Burleigh Brooks, distributor of the Rolleiflex camera for America the new Agfa Color will be available for that camera about the first of January, 1935. Announcement would indicate that this process is developed to such a point that it is much faster and much easier to use.

Single Exposure Device

● A new accessory for the Leica camera is announced by E. Leitz, Inc. The Single Exposure Film Holder is a thin metal device which holds a strip of standard 35-mm film of from two to three inches long. This carrier slips into the regular Leica camera and makes possible the exposing of a single negative.

To make single exposures in this manner, the camera is of course loaded and unloaded in a darkroom, and the device is intended primarily for testing purposes, which it serves admirably well.

This single exposure apparatus is not to be confused with the "Oligo" Single Exposure Camera, which is a complete camera in itself. The device is for use in any standard model Leica camera.

Kodak Retina

● This tiny newcomer in the miniature field takes thirty-six pictures on a roll of film supplied in a daylight-loading magazine. Two emulsions are available: Kodak "SS" Panchromatic Film (No. SS135) and Kodak Panatomic Film (No. F135). The actual picture size is 24x36 mm.

Loaded as easily as a Brownie, Kodak Retina carries all of its controls within easy finger-tip range. Two large knurled knobs facilitate the winding and rewinding of the film. The film is always locked in position. At a turn of the conveniently located film-release knob only enough film for the next exposure can be wound forward, when it again automatically locks. This eliminates any chance of overlapping, resulting in wasted film. Once set at the first exposure, the succeeding exposures, up to 36, are automatically shown on a dial. In a split second the picture taker is ready for the next exposure. This speed in operation is invaluable when and if it is necessary to take a series of pictures of moving subjects.

The film is numbered from 1 to 36 and when developed the number of each picture appears on the margin of the Kodak Panatomic or "SS" Panchromatic Film loaded in the new Kodak film magazine. This new feature enables the user to order prints and enlargements for his film strip by number.

With eight speeds, including 1/300 second, time and bulb action, the well-known Compur shutter is capable of handling almost any subject.

The shutter versatility is matched by the speed of the f.3.5 anastigmat lens. When the Retina is closed it affords complete protection to the lens.

Two Kodak Portrait Attachments and three color filters are available. The "A" portrait attachment, with distance set at "infinity," reduces the focal distance to 41 inches; "B" reduces it to 25 inches. When the camera is focused at 3½ feet these distances are reduced to 21 inches and 16 inches, respectively.

The three color filters are: light yellow (N-1), medium yellow (N-2), and green (N-3), with filter factors under daylight of 1.6, 1.9 and 2.2 respectively.

Filters and portrait attachments screw into the lens mount and are so compact that the camera can be shut with either—but not with both—in position. Filter and portrait attachment may be used together when the camera is open.

The retail price of the Kodak Retina is $52.50.

New 16mm Film Reel

● Herman A. DeVry Inc. announce a new 1600-ft. 16mm reel. The rims and spokes of this reel are of spring steel bands, bending easily but instantly returning to their original alignment. The spokes are riveted to the rims, but at the hub they slide under a steel band to allow for the molecular expansion which metal suffers when bent or subjected to any violent strain.

Another innovation is a well in the top of the hub to hold the film in the reel when starting the rewind. The film is laid over the well and pressed lightly with the finger; film perforations catch on prongs and hold the film securely until end of run.

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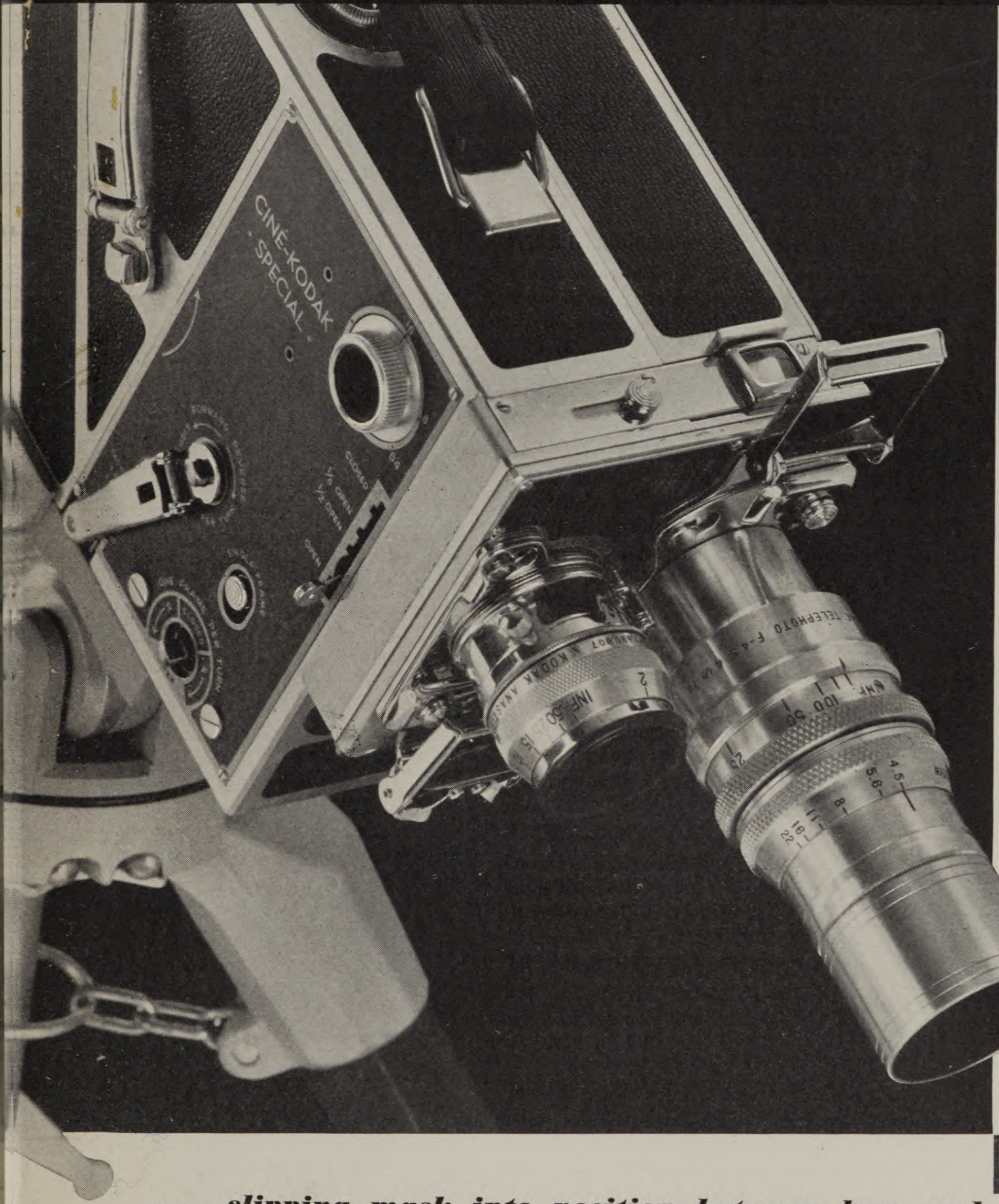
Admittedly...the Pick of the 16mm. Field

CINÉ-KODAK SPECIAL



- **Ground-glass focusing**
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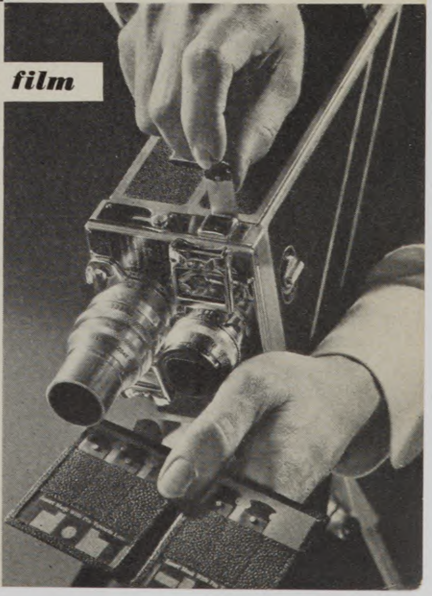
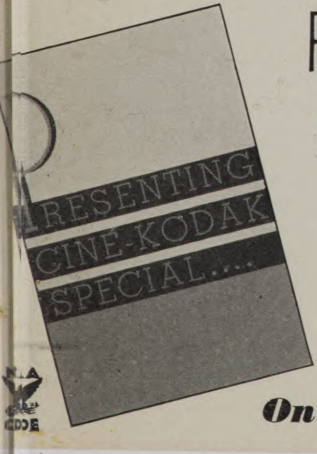


. . . slipping mask into position between lens and film



FREE...A large-sized 16-page booklet detailing the advantages of this finest of 16 mm. motion picture cameras. Write to Eastman Kodak Company, Rochester, N. Y., for "Presenting Ciné-Kodak Special."

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HERE'S HOW

by A. S. C. Members

HOW can I hyper-sensitize film for use in my miniature camera?
—A. R., Rangoon, India.

For those who wish to hyper-sensitize film for greater speed, the following process may be employed:

The strongest form of commercial ammonia should be used. This is 28%. The bathing of the film must be done in total darkness and in a clean room free from dust. A **clean** miniature film developing tank is suggested for convenience. Use one part of ammonia to twenty-four parts of water and be sure that the solution is kept at 50 degrees F. Pour the solution in the tank and agitate gently for one minute. Care must be taken to prevent the formation of air bubbles on the film. Transfer film to a bath of equal parts of water and grain alcohol. This is to facilitate drying. Dry quickly in front of an electric fan, being careful to avoid dust. The film should be used as soon as possible.

—Clarence Slifer, A.S.C.

WHAT developing formula would you suggest to secure maximum density with miniature camera negatives?
—A. R. C., New York City.

The D82 formula for maximum density development is as follows:

Water (125 degrees F.)	24 ozs.
Wood Alcohol	1½ ozs.
Elon	200 grs.
Sodium Sulphite (desiccated)	1¾ ozs.
Hydroquinone	200 grs.
Sodium Hydroxide	125 grs.
Potassium Bromide	125 grs.
Water to	32 ozs.

Developing time is four to five minutes at 65 degrees F.

If the solution is diluted and the wood alcohol left out, it will lose its developing energy.

—Clarence Slifer, A.S.C.

WHAT would you consider the slowest shutter speed with a hand-held camera?
—A. M., St. Louis, Mo.

While it was suggested that 1/20th second be considered as the slowest shutter speed that may be safely used with the hand-held camera, it was not meant to discourage you from using slower exposures. They may be used, when it is the question of a fair picture or no picture at all. With my model F Leica, I have made many satisfactory hand-held exposures up to one second in duration. However, the greatest care must be exercised. An extremely valuable aid for slow exposures is the Grace Beltipod (a unipod camera support that slips over the belt or overcoat button). Such a support facilitates the using of slower or longer focal length lenses for night photography. Just imagine the exposure and photographic possibilities obtainable with an f2:0 lens and one second exposure.

—C. W. D. Slifer, A.S.C.

IS IT possible to print 16mm negative on 35mm positive stock, that is, enlarge 16mm to 35mm? Would this procedure cause the grain to become coarse? Is there any fine grain developer that would overcome this difficulty?
—L. G., Chicago. Ill.

While it is physically possible to enlarge 16mm to 35mm it is not considered practicable because of the coarseness of the grain. This has been done on several occasions when no other type of negative or print was available. At the time of the Lindbergh kidnapping the prints of the Lindbergh baby shown in the newsreels were enlargements of 16-mm pictures made by the Colonel of his baby.

The present newsreel shots of the Galapagos Island mystery showing some of the people who are down there are seemingly enlargements of 16mm. It is a well-known fact that G. Allan Hancock, the scientist who is familiar with these islands and who has cruised them frequently, has taken many 16mm pictures of them and the people on them. In recent news reels he is given credit for the pictures of the islands and the people on them. It is possible that these pictures were also enlargements of 16-mm. At least they have every evidence of being dupes or enlargements.

—Ray Fernstrom, A.S.C.

SOMETIMES in close shots, I find that although I carefully frame my shots in the finder, on the screen the subjects often have the tops of their heads cut off. Why is this?
—W. L. D., Cambridge, Mass.

This is caused by what is known as parallax between the finder and the lens. Obviously, your finder is on top of the camera; when you get close to your subject, the finder and the lens do not cover exactly the same field, due to the distance between the finder and lens. Most modern cameras have an adjustment on the finder—usually a means of sliding the eyepiece up to alter the finder's angle of field—to compensate for this. (If the finder is at the side of the camera, the error and adjustment are, of course, to the side.) If your camera has no such adjustment, the only thing to do is to remember whenever your subject is closer than ten feet from the camera, and sight through your finder allowing more than ample head-room at the top of your picture.

—David Abel, A.S.C.

WHY is the film for the 8mm cameras furnished in the 16mm width and slit after exposure and development? Why isn't this film furnished us already split in the 8mm width?
—S. R. C., New York City.

According to tests made by the Eastman Company it was found that the furnishing of the film split in advance would not be so practical as furnishing it in 16mm length. If you have attempted to develop motion picture film in any lengths you know it will stretch. It was found in testing film split into an 8mm width that the stretching of this film was greater than in the 16mm width, so much so that it was inclined to come off the drying drums longer than before it was processed. This would mean a lot of trouble in accurately-made projectors. It might also keep the operator busy with the framing lever attempting to keep his picture in frame. In my own experience I have found that this film will stretch a little even after it is processed because of its very narrowness. The strain in the projector and in the rewinds is to pull this film, so the tendency would be to lengthen it.

—Arthur Miller, A.S.C.

Adapting Professional Lighting to Amateur Movies

Continued from Page 29

relieve the flatness of that part of the view, so we'll place lamp "B" either on the bookcase to the left, or on a high stand near it. Lamp "B" can be either another 500-watt unit (undiffused), or a Photoflood unit. It will give us these background high-lights we want, and, if properly placed, it can also simulate the light falling on the subject from reading-lamp "F." Not being diffused, it will give us a harder, snappier light. The respective distances between the subject and lamps "A" and "B" can be balanced so as to get any desired light-balance. Bear in mind, of course, that the light from lamp "B" should naturally be a bit the more intense, as that is to be the high-light side of the picture.

Now, our picture will show a little of the room beyond; so there will have to be some light there. If you are getting enough of the room in your picture to warrant it, it might be advisable to cast some shadow-patterns on its farther wall, with Photoflood units. However, the first thought we have when we think of an illuminated room in the distance, is that some light must stream out. Therefore we take lamp "C," another 500-watt unit, and place it as shown, using a diffuser if it appears advisable. As the sketch shows, it will give us the patch of light apparently streaming out from the back room, and also a nice edge-lighting (or back-light) on the edge of the curtains.

On the wall behind the subject, there is a wall-fixture, which we will assume is fitted with ordinary, flame-tinted 25-watt globes. We can turn these on—not for actual illumination, to be sure—but for the natural effect their glow will give. To heighten this, we can place a diffused spotlight on the mantelpiece, focused on the wall-fixture, so that it gives us precisely the patch of light that such lamps cast on the wall behind them—but (thanks to the spotlight) raised to photographable intensity. Now, in reality, such a wall lamp would have an effect upon the furniture in front of it—and of course, upon the people, too. This result would be an edge-light or backlight: so we simulate this by placing a Photoflood unit—lamp "D"—in line between the chair and the wall-fixture, and in such a position that it is screened from the camera by the book-table. This will give us the effect we want—a backlight on the edges of the chair, table, and subject which will separate them from the background. Lamp "D" should be as high off the floor as is practicable, and well behind the subject. Remember, we are shooting with a 15mm lens: and at this distance our vertical field is 3.4 feet; we will naturally cut the picture some little distance from the floor. Therefore, we can, if necessary, put lamp "D" right on the floor, and it would probably be out of the picture: but we will get a better effect if it is raised a couple of feet from the floor, and masked by the table. If we include the legs of the table, this lamp can be placed at such an angle, that, while still doing its primary work, it will also give us a back-lit effect along these legs.

The main source of our apparent light is, of course, reading-lamp "F." We can deal with this as seems most advisable: either putting a Photoflood into it, and using it as part of our bona-fide lighting, or merely putting a moderately strong bulb (say 150 watts) into it, simply to suggest that it is a major light-source, and letting the actual light come from lamp "B."

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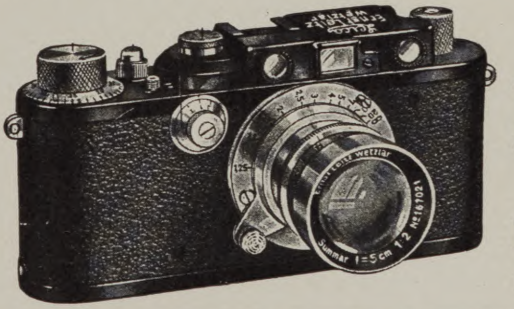

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TRICKS and GADGETS

● For the past two months this department was replaced by the description of the trick titler by Ed Lucas. That was a contribution by Lucas to the Tricks and Gadgets contest.

We have such a wealth of material submitted it is going to take us several months to catch up with the supply.

Film Viewer

Here's a mighty practical gadget and at the same time one that can be built by almost anyone, whether he is handy with tools or not.

It was submitted by J. D. Cochrane of North College Hill, Ohio. Cochrane tells us of other interesting things he has built, but submits his View Finder in the contest.

If you will study the photograph and little sketch as we describe this gadget we are sure you will realize that it can be built by anyone who owns a saw and a few other tools.

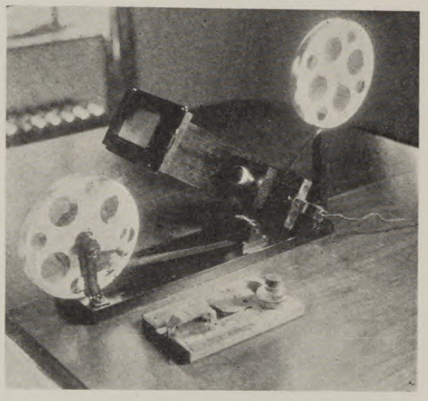
The first thing you will need is a light source. Cochrane used a small reading light, the type which clamps to a book. This as you know comes equipped with a reflector. If you will look at the photo you will be able to see the electric wire leading in from the right edge of the photo.

Next a condenser is necessary. If you haven't one you can purchase one from Eastman Kodak Company. Cochrane used one he had in an old Model C Kodascope. This condenser you will have to place in front of your light source, but back of your film. Look at your projector and you will see in what order these things are used. You will find a reflector, the light, a condenser, then your film gate, and then your projection lens.

Next in order Cochrane placed a piece of frosted glass to give a diffused light and also to protect the film from excessive heat coming from the light source.

A film gate was the next item in order. This you will note from the little sketch is made up of layers of polished metal, bakelite or heavy film. It is through this gate that the film is conveyed, touching only the outer edges of the film, thereby eliminating the possibility of scratching the emulsion or film. This slide or guide will give you the desired width, you, however, will have to mask off for the height so as to take in only one frame at a time. You can build the mask from the same material you use for constructing the guide; you lay this mask, however, on top or below the guide.

Next you will need a lens. This you merely take from your projector. In other words your projector lens will live a double life. It will continue to serve on the projector and will double on your viewer. You will have to mount this in such a way that it can be raised or lowered for focusing.



The last piece for the viewer is the frosted or ground glass on which the picture will be viewed. You will note from the picture that this was attached very simply. This glass has only one upright support, a board on the left. Cochrane did not box this in; the three sides are left open and the glass fitted on top with a frame of some sort.

So as to use this with his rewinds he built a special support for a 400-foot reel as shown on the right of the photo. In view of the fact that this support does not have to have a rewind it will not be difficult to make as it will merely be necessary to have an upright piece and a peg of some sort on which to place the reel.

The framework of the viewer is basically two pieces of board, one at the bottom for the main support and one at the side to support the ground glass used for the screen. A simple angle-iron mounting will permit you to place this at any angle you desire. These angle-irons secured at any 5 and 10 can be bent easily.

While this is not a beautifully finished viewer, still it is practical. Care should be taken in building that portion which makes up the guide and gate and the method used to bring it toward the other rewind. The photo would indicate that Cochrane has used a roller on that side. Whether this is made up of an ordinary spool or something else is hard to determine, but it would be well to have a roller of some sort at this point, and depending upon the angle of this viewer, to have one at the other side so as not to scratch the film.

Home-Made Humidor Can

J. R. Newhart of Milwaukee writes in how he has made a humidor can from some of the old 400-foot 16mm positive cans which he had on hand. These cans are not made with humidors. Newhart secured a small supply of copper screening, the kind used on doors and windows. He selected copper as this will not rust.

Next he purchased some liquid solder. This can be secured from the 5 and 10 for 10c. In addition to this he merely needed either strong scissors or tinsnips. He tells us he bought a pair of tinsnips from the 5 and 10 for 15 cents, and that the screen wire cost him 12 cents. From this wire he made 8 humidor cans.

This was his method. He cut a piece of screening the size he wanted for the bottom of the can. He cut a piece of blotting paper smaller than this wire, then he placed the wire over the blotting paper in the bottom of the can, applied the liquid solder to the edges of the wire, and he had a humidor can.

The reason for fastening the wire was so that it would not fall out overy time the can was turned over. Of course, it is not necessary to fasten this wire, it merely acts as a separator between the reel and the blotter. Also this wire can be cut oblong and fastened at each end only, so that new blotters can be placed under it from time to time.

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There is yet another possibility open to us in some cases, for getting our backlighting—from the ostensible source of the wall-lamp. This is to hang a lighting unit, professional-style, from the moulding on the wall. It would replace lamp "D," of course, or supplement it, if we want that lamp's effect on the table-legs. It would naturally have to be inclined in such a way as to avoid directly striking the camera lens; and a deep lens-hood is always advisable when working with artificial lights. When using this method, remember that you can do a great deal with such lights which, while they may be in front of the camera, are actually out of the area being photographed.

The photographic illustration, aside from giving an idea of how professional sets are made to order for photography, and giving some hints as to this type of lighting (note the "baby" spot on the wall, in the same service as our lamp "E"), also illustrates a point we have not as yet mentioned: this is the high-lighting of the picture on the wall. You will notice, just over the portrait of Queen Victoria, a "Baby Spot" (not diffused, but well "flooded out") which is hung on the wall just outside the camera-line, so that its beam strikes down across the picture, high-lighting it and its frame—and also the door-frame beyond. This is a useful idea for emphasizing any particular feature of a room. Similar methods can easily be adapted to the individual requirements of the amateur.

Equipment Prizes Awarded

Continued from Page 24

Robert F. Gowen, Ossining, N. Y., for his picture "The Menace."

Frank Gunnell, Staten Island, New York, for his picture "From Winter Snows to Summer Sunshine."

Howard J. Hargraves, Chicago, Ill., for his picture "Dark Horizon."

Duncan Mac D. Little of New York City for his picture "Circus."

Dr. Donald H. Miller, San Leandro, Calif., for his picture "Hobby Within a Hobby."

Walter Mills, Grand Rapids, Mich., for his 8mm picture "Noon Hour."

Sylvanus F. Nye, Kenmore, New York, for his picture "Christmas 1933."

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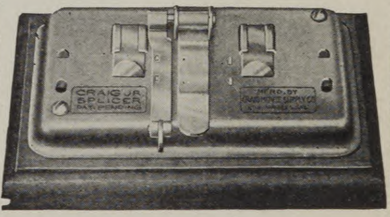

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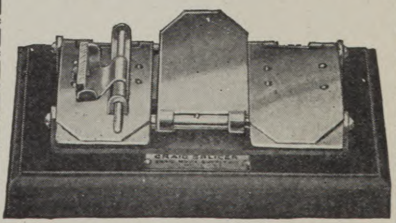

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R. F. Oden, Pasadena, Calif., for his 8mm picture "Symphony Mechanicus."

Dr. G. L. Rodenburg, New York City, for "The Butterfly."

Alvin D. Ross, New York City, for "Interlude Between Acts."

K. G. Stephens, San Francisco, Calif., for "Holiday."

Freeman F. Taylor, Llanerch, Pa., for "Zoorilla."

K. Tsukamoto, Japan, for "An Alpine Conquest."

H. W. Voss, Ft. Meyer, Fla,. for "Florida Montage."

E. W. Walker, Beverly Hills, Calif., for "Death Valley."

L. Clyde Anderson, Salt Lake City, Utah., "Canyons of Romance."

W. R. Anderson, Salt Lake City, Utah, his 8mm picture "Our Family Album."

H. M. Armstrong, Cape Cottage, Me., for "The Coming Forth of A Nation."

E. M. Barnard, Kansas City, Mo., for "Christmas, 1932."

Lawrence Legg, Council Bluffs, Ia., for "Us Guys on Vacation."

Y. Kaneko, Japan, for "A Fishing Village."

F. C. Ells, Yokohama, Japan, for "Tambo."

Vincente Mills, Manila, P.I., for "Flagellation in the Philippines."

Nemo, London, England, for "A Day Excursion."

J. B. S. Thubron, Fleet, Hants, England, for "Her Second Birthday."

LET'S TALK ABOUT LENSES

Continued from Page 27

And now for a word on suggesting the right focal length telephotos for your jobs. Many cinephotographers find the 2" telephoto (sometimes also called a "long focus" lens) very well suited to such things as street scenes. Its included field is just half as high and half as wide as that of the 1" lens, and is regarded as a connecting link between the normal 1" and the telephoto series. Perhaps the most popular telephoto lens is the 3", because its field is such as to appreciably magnify distant objects, such as the players of a football team, and because of its relative cheapness compared to still longer telephotos. Also, it is possible to obtain a fair picture with the 3" telephoto even tho the camera is hand-held.

Beyond the 3" are the 3½", the 4", the 6", and now comes the latest thing in telephotos—the 10", 12", and 14" telephotos. Except for special work, which the average amateur may never even dream of encountering, anything over a 6" lens on a 16mm camera is to be bought with our eyes wide open to the extremely ominous possibilities of blur thru wobble of the camera, even tho it be used on a tripod. Even the most rigid of tripods will transmit vibrations too slight for us to notice to a camera, and the longer the focal length, the more trouble we're likely to get into from jumpy pictures.

Perhaps you've noticed that there seems to be a form of "distortion" in your films made with any lens other than the normal 1" 16mm lens or the ½" 8mm lens. A shot made with the wide-angle lens has the peculiar flat appearance of a Brownie camera picture, and shots made with telephotos don't seem to have the proper "perspective." You've no doubt noticed, even on the professional screen, that a telephoto shot of, say, a landing airplane shows the plane practically the same size several hundred feet away from the camera as it does fifty feet away.

I thought we'd get around to discussing this "distortion" this month, but inasmuch as the effect in cinephotography is really tied up with projection, suppose we defer the matter until next month's concluding article of the lens series. If you've been reading articles on lenses lately and have been led to believe that there is no such thing as distortion in viewing, please draw up a chair at next month's session and prepare to watch the fireworks. See you then.

Formula for Reversing Film

Continued from Page 28

Immerse the film in this until the parts formerly densest become quite transparent. If there are found to be dark spots on the film, reversion is not complete; rinse the film thoroughly and return it to the reversion bath. Then wash, and bleach again.

The final step is darkening; this is done in a solution prepared by adding 150 grains of Sodium Hydrasulphite (NOT hyposulphite) to the bleaching bath. The film is placed in this, and the image steadily darkens until a good, brownish-black positive is produced. It is important that the Sodium Hydrosulphite be perfectly fresh: otherwise the image may not darken sufficiently, or may turn an unsatisfactory sepia tone.

After darkening, the film should be

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thoroughly washed in running water—at least 15 minutes—and then dried. Each of these solutions is sufficient for about 30 feet of sub-standard film, although the developer will last for about 90 feet. The quantities given here are those intended for use in the tanks made by the Pathex people in Europe, which hold 26 feet of film (one full Pathex charger). They are not as yet available in America, but may be had either from MM. Pathe-Enseignement, 20 BIS rue La Fayette, Paris, 9e, France, or from Pathescope, Ltd., 5 Lisle Street, London, W.C.2., England. The solutions recommended can, of course, be made up in any larger quantity for use in larger tanks. Incidentally, the chemical type of reversion does not require a solid drum developing system.

With regard to the processing of reversal film by individual amateurs, most of the manufacturers state that while methods outlined above will work with their products, they do not recommend individual processing, as an individual is rarely equipped to exercise the same exact control of all operations that the regular processing stations do. If an individual feels it is necessary to process his own film, the manufacturers point out that far more satisfactory results can be obtained by developing the film (reversal or otherwise) as a NEGATIVE and subsequently making prints from it.

Wheels of Industry

Continued from Page 30

16mm Recording Unit

● The Hollywood Motion Picture Equipment Co. announces a very small recording unit for 16mm cameras that consists of a glow tube about as big around as a pencil and one inch long, an amplifying set made up of one tube using a 2-volt battery. These items, together with the B battery and microphone, make up the netire Recording Unit.

Present plans are to sell the unit to the individuals and they to have local machinists fit them to their existing cameras.

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WE BUY—sell or rent everything necessary for the making — taking — or showing of motion pictures. Sound or Silent — 35mm and 16mm. We specialize in equipping expeditions. Ruby Camera Exchange, 729 7th Ave,. New York City. T

INTRODUCTORY Offer. 8mm subjects, 50-ft. reels, $1.50. Interesting variety of subjects now available. Also 16mm sound and silent film. Sales, rentals and exchanges. Harry Mendelwager, 317 West 50th St., New York, New York.

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shaped fungus; national championship auto races and other interesting short subjects.

Peerless Cine News will be released once each month in both silent and 16-mm sound-on-film and will contain news events of national and international importance, historical events, odd and interesting people and places, human interest stories and educational subjects.

PHOTOGRAPHIC ANNUAL

The 1935 Annual has been issued by the American Photographic Publishing Company.

This year's edition contains much for the miniature camera user. One article that will undoubtedly interest is by John Lanctot on "The Control of Graininess." The artistitc side is recognized by such articles as "Line and Tone as Expressive Factors in Composition" by William S. Davis. "Home Portraiture with the Miniature Camera" is the subject handled by E. T. Howell.

Focus in Cine Work and Cinema Evidence in Courts will undoubtedly interest those in amateur movie activity.

Other interesting articles are "A Universal Focal Slide Rule," "Filters in Press Work," "Notes on Infra-Red Photography," "Possibilities with Photoflash Lamps," "Standard Darkroom Procedure," "Home Portraiture with Miniature Camera," "Pictorial Possibilities in the Portrait Studio," "Night Photography in Natural Colors," "Aerial Photography," and other pertinent subjects.

TRICKS GADGETS

Another Contest

Here's how it works. Send us in tricks you have done in filming with your 8mm, 9½mm or 16mm camera. Explain them to us so that we can explain them to others in the pages of American Cinematographer.

For every one we publish you will be entitled to your choice of one of the prizes listed below.

By Gadgets we mean little pieces of equipment you have built, designed or devised. Equipment that works. Little gadgets you have added to your camera, projector or otherwise. For instance, we heard of one fellow who built a splicer out of a mouse-trap . . . that's a gadget.

What kind of gadgets have you made . . . what sort of tricks do you do with your camera or equipment? If necessary send us a rough sketch or a snap shot of your equipment if it will help describe it better and quicker.

Here's Your Chance to Win Equipment or Film

Frequently we have published what might be termed tricks. Such as making distorted effects by pouring sweet-oil over a glass in front of the film. Others have been published from time to time.

In the way of gadgets we have reported many things from the building of a complete 16mm camera by amateurs down to making their own reels.

What Have You Done?

Here are the prizes . . . you may make your choice of any one of them.

- Beltipod
- Filter Holder
- Choice of Filter
- Splicer
- Half-Dozen 16mm Reels
- Half-Dozen 16mm Cans
- 3 Reels and 3 Cans
- 100-ft. Roll of 16mm Pan Film
- Two Rolls of 8mm Film
- 8mm Splicer and Rewind
- Humidor Can Case for 12 Reels
- 22x30 Beaded Screen
- 3 Clamp Lamp Reflectors with 3 Photoflood Lamps
- One Dozen Photoflood Lamps

Send Your Entries to Editor

*A*merican *C*inematographer

6331 Hollywood Blvd., Hollywood, Calif.

Prosperity for 1935!

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Everything points to an industrious and prosperous Year. It is our sincere hope and wish that you will share liberally in that prosperity and that the Mitchell Camera will continue to play its important role in the production of successful pictures

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Mitchell Camera Corporation

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